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DOTTORATO DI RICERCA IN MANAGEMENT
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***THE RELATIONSHIP BETWEEN MATCHING ‘PRINCIPLE’
AND EARNINGS ATTRIBUTES***

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DI
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PREFACE

Since the link between expenses and revenues is one of the basic concepts underpinning accrual accounting, the matching process has been defined as the central purpose of accounting, becoming a ground rule in the determination of periodic income. However, it is also true and has to be considered, that various issues have been raised about the usefulness of matching. In connection with this, the most often raised issue refers to the understanding of what matching means, depending on who is discussing about it. Specifically, it seems that the only reason why matching has been interpreted in so many different ways is that, in assessing the usefulness of matching processes, it has been modified to provide the accounting information required at a given period of time. Moreover, beside the different interpretations of matching process that followed the need to provide specific accounting information required at a given period of time, another fundamental issue, that has been pointed out, refers to the differences in matching process between the two main ideas of accounting system: the revenue/expense model and the asset/liability approach.

Although there is an inherent conceptual tension between these two approaches, in practice, financial accounting has always been a pragmatic compromise between them. However, during the last decades, the emphasis of financial reporting standards have been gradually shifting from the revenue/expense model to the asset/liability approach.

In response to the clear position taken by regulators and standard setters, several scholars have stressed theoretical and empirical drawbacks associated with the

asset/liability approach, especially in connection with the substantial withdrawal from some fundamentals of accounting, among which the revenue recognition and the matching process rules.

Starting from a theoretical and empirical review of all issues related with the accrual accounting system and its fundamentals, this study aims to analyze the consequences of a change in the financial reporting system on the effectiveness of the process of matching expenses with revenues. Further, the analysis also aims to directly assess the effect that the possible different degree of matching could have on the quality of accounting numbers of private firms, controlling for a set of variables that might affect both matching process and earnings quality.

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CHAPTER I

The Accrual Basis of Accounting

1. Cash and accruals as alternative performance measures

A firm is a business organization that can be defined as an open system which steadily interacts with both internal and external environments, having a continuous exchange of information¹. However, the different kinds of stakeholders have interests and expectations that are only partially converging towards each other and, therefore, it is not so easy for a company to equally satisfy all disclosure needs. It follows that business organizations need to provide various information that differ from each other in terms of magnitude, frequency, and details, according to the special needs of each class of stakeholders. Therefore, according to Paton and Littleton (1940), a firm's disclosure should be based on a balanced consideration of all the interests involved.

Among the wide range of information that a firm can disclose, particularly relevant are those obtained from the financial reporting activity that are the basic data source for a wide group of stakeholders. In fact, the well known information issue related to the information asymmetry between insiders and other contracting parties² gives rise to a demand for internally generated measures of firm performance to be reported over finite time intervals (Dechow, 1994). Moreover,

¹ Note that the terms 'firm', 'company', 'business organization', and 'economic entity' are used interchangeably.

The internal environment includes actual shareholders, managers, and employees, while the external environment refers to customers, suppliers, investors, financial institutions, public administrations, and all other members of civil society that may have some interest in the firm.

² For more on this topic, see (for example) Akerlof (1970) and Jensen and Meckling (1976).

because of the information asymmetry, external parties must face the trouble to assess the reliability of disclosed information, if objective procedures to determine performance are not stated. Therefore, because in the accounting world sometimes it holds that the profit is a point of view, while the cash is a reality (Gîrbină and Bunea, 2008), the interest of many accounting information users is addressed towards cash. Furthermore, since the success of a firm depends ultimately on its ability to generate cash receipts in excess of disbursements, a performance measure that could be used is realized cash flows (Dechow, 1994). In fact, cash can doubtless be considered the most verifiable and reliable accounting information that a company can provide. In relation thereto, Bernstein (1993) states that cash flow, as a measure of performance, is less subject to distortion because it involves the lowest degree of calculation subjectivity. Moreover, cash is also a wide used indicator in the assessment of economic entities, offering information on financial stability, the risk of bankruptcy, and so on. In fact, Lawson (1992) and Lee (1985) recommend cash flow as an helpful tool for investors in their decision making process, while Charitou and Ketz (1991) and Lee (1993) suggest that it can be seen as the powerful instrument for predictive purposes, particularly for predicting future cash flows.

Accordingly, the most suitable financial reporting system would appear to be the cash-basis accounting whereby the firm's books are kept based on the actual firms' inflows and outflows of cash. As stated by Lee (1981), the cash flow reporting system is based on periodic cash inflows and outflows, free of credit transactions and arbitrary accounting allocations. Inflows include cash from trading operations and providers of long-term finance, while outflows include

payments for replacement and growth investments, taxation, interests, and distributions. Therefore, under the cash accounting method, revenues are recognized in the accounting period in which the payment is received, and expenses in the period in which the payment is made. This means that revenues will not count until the cash has been received and, similarly, expenses will not count until the money leaves the firm³. Consequently, income is computed as the difference between cash receipts from revenues and cash payments for expenses. However, over finite time intervals, reporting realized cash flows is not necessarily informative because of the net cash flows fluctuations, with cash inflows and outflows that follow the firm's investment and financing activities as well as the firm's operating activities. For this reason, it can be assumed that realized cash flows have timing⁴ and matching⁵ problems which cause them to be a 'noisy' measure of firm performance (Dechow, 1994). In fact, the relation between revenues and expenses, and cash flows is not necessarily one-to-one, because some revenues, as well as some expenses, could have a deferred payment. This means that realized cash flows could suffer from matching problems because cash inflows and outflows, which are strictly related to a specific activity, could be recognized in different measurement periods.

³ Note that cash transactions eligible for recording in a cash-basis accounting system also include forms of payment that will turn into cash very quickly, including checks, credit cards, bank debit cards, and bank wire transfers.

⁴ Timeliness is the ability of promptly capture and recognize events that affect the firm, in order to provide information for decision makers before they lose their capacity to influence decisions.

⁵ At this step, it is sufficient to say that matching principle requires that expenses must be recognized in the accounting period in which the revenues, to which those expenses are related, are earned and recognized.

For this reason, Dechow (1994) starts investigating whether cash flows have time-series properties which could be consistent with the idea that cash flows suffer from matching problems. Specifically, her results indicate that changes in net cash flow per share exhibit on average a negative autocorrelation and that changes in operating cash flow per share still exhibit an average negative autocorrelation even if smaller than the former. This suggests that cash flows suffer from temporary mismatching between cash receipts and disbursements⁶.

Moreover, realized cash flows could also suffer from timing problems even regardless of matching ones. In fact, as reported by Dechow (1994) a matching problem is a sufficient but not a necessary condition for a timing problem. This is why, the mismatching of revenues and expenses implies that either revenues or expenses must be recognized in the wrong period. However, if both revenues and the associated expenses are recognized in the same wrong period, then they will be correctly matched, but still suffer from a timing problem. Thus, matching problems can be considered as a subset of timing ones, which imply that cash receipts and outflows are reflected in a decision making process related to earlier or subsequent measurement periods, although they are correctly matched because their recognition occurs in the same period (Collins et al., 1994).

Therefore, a periodic reporting system based on cash flows cause a performance measure with timing and matching problems because cash flows do not coincide with the net economic benefits to shareholders in a given accounting period (Frankel and Sun, 2014).

⁶ For example, a large cash outflow in a period is more likely to be followed by a large cash inflow in the following period, due to the normal life cycle of investment and disinvestment of an economic entity.

These issues were analyzed and modeled by Dechow (1994)⁷. In particular, she sets up a simplified example based on a firm which has only sales.

The starting point of the model is the definition of the cash collected during an accounting period:

$$Cash_t = [(1 - \alpha) * Rev_t] + (\alpha * Rev_{t-1}) \quad (Eq. 1)$$

where $Cash_t$ represents cash collected in the accounting period t , Rev stands for the revenues generated from sales made during accounting periods t and $(t - 1)$, and α is the proportion of sales for which cash is not collected until the next accounting period. It must be noted that, in this model, α is assumed as a constant for each accounting period, so cash collected in the accounting period t is composed of both the proportion (α) of sales made in the period $(t - 1)$ that have not been collected yet, and the proportion $(1 - \alpha)$ of sales made and cashed in the period t . Therefore, realized cash flows will differ from the economic net benefits realized in each period to the extent to which credit sales are excluded from realized cash flows and realized cash flows include collections from the previous period's credit sales.

In such settings, if a steady-state firm is defined as one that is neither growing nor declining, it follows that $Rev_t = Rev_{t-1}$. Substituting Rev_t for Rev_{t-1} in Eq. 1 implies that $Cash_t = Rev_t$ ⁸. This means that, in a steady-state firm there will be no difference between the accounting numbers reported under the cash-basis

⁷ She is not the first to investigate the problems related to the cash-basis reporting (e.g., Paton, 1922, Paton and Littleton, 1940, among many others to be added.) However, she marks an attempt to contrast the empirical properties of earnings to cash flows based on the role of accruals.

⁸ The process is as follows: $Cash_t = [(1 - \alpha) * Rev_t] + (\alpha * Rev_{t-1}) \equiv Cash_t = [(1 - \alpha) * Rev_t + (\alpha * Rev_t)] \equiv Cash_t = 1 - \alpha + \alpha * Rev_t \equiv Cash_t = 1 * Rev_t \equiv Cash_t = Rev_t$.

system and the realized economic benefit. Therefore, the accounting reporting system based on cash flows cannot be labeled as a poor measure of performance for firms that are in a steady-state.

However, the steady-state assumption is an oversimplification because it's quite rare that a firm does not have an increase (or a decrease) in sales over each period.

In this case, $Rev_t \neq Rev_{t-1}$ and it follows that:

$$Rev_t - Cash_t = \alpha * \Delta Rev_t^9 \quad (\text{Eq. 2}) \quad \text{where } \Delta Rev_t = Rev_t - Rev_{t-1}$$

As reported in Dechow (1994), Eq. 2 highlights that the magnitude of the difference between revenues and cash flows for any period will be greater the larger is the proportion of sales on credit for which cash will be not collected until the next accounting period (α), and the larger is the change in revenues (ΔRev_t).

Even if the model is focused on revenues from sales, it is readily generalizable to all others accounting features, and suggests that, when firms are not in a steady-state, realized cash flows are expected to be a relatively poor measure of firm performance because they suffer from the abovementioned timing and matching problems, and are less able to reflect firm performance.

Besides the timing and matching issues, an additional problem related to realized cash flows refers to the lack of information content about the future. In fact, cash flow provides an incomplete basis for assessing the prospects for future cash flows because it cannot show inter-period relationships. For this reason, realized cash flows are assumed to not provide all information which could be useful to

⁹ The process is as follows: $Cash_t = [(1 - \alpha) * Rev_t] + (\alpha * Rev_{t-1}) \equiv Cash_t = Rev_t + [\alpha * (Rev_{t-1} - Rev_t)] \equiv Cash_t - Rev_t = [\alpha * (Rev_{t-1} - Rev_t)] \equiv Rev_t - Cash_t = [\alpha * (Rev_t - Rev_{t-1})] \equiv Rev_t - Cash_t = \alpha * \Delta Rev_t$.

predict future cash flows or performance¹⁰. Therefore, given that the interest in a business organization depends on its ability to generate favorable future cash flows, a performance measure exclusively based on realized cash flows (especially during a short period) cannot adequately indicate whether an enterprise's performance is successful.

That said, management could attempt to determine the firm's expected future cash flows. In such a way, problems of timing and matching could be bypassed because the focus would no longer be on completed transactions. In fact, the time of their recognition would become irrelevant. Moreover, the problem associated with the lack of information about the future would also be overcome for the benefit of stakeholders. However, even if managers have a wealth of available information, a reporting system based on predictions of future cash flows would provide the management with too much flexibility and should imply great confidence among stakeholders. Thus, any signal produced would be difficult to verify and would result in unreliable and useless measures of firm performance, without filling the information gap between insiders and external parties.

A compromise between the reporting system based on realized cash flows and a set of expectations about future cash flows, is the accrual-basis financial reporting system whose primary product is net income, or earnings, as a measure of performance.

Accruals are adjustments for earned revenues and incurred expenses that are not yet recorded in the accounts. This means that, accruals allow business organizations to recognize, in a certain reporting period, revenues and expenses

¹⁰ The usefulness of financial reporting require that the information provided to external parties enable them to make proper economic decisions.

for which they expect to obtain or spend cash, respectively, in a future reporting period. Therefore, the accrual accounting method is a fair review of business transactions. In fact, accrual-based accounting allows to measure the performance of a business organization by recognizing economic events regardless of when cash transactions occur. Specifically, this method requires the recognition of revenues when they are earned – the goods were supplied or the services rendered – without conditioning their collection, and expenses when they are incurred without taking account of the time of receipt or payment of cash. The general idea is that economic events are recognized by matching revenues to expenses at the time in which the transaction occurs rather than when payment is made or received. This method allows the current cash inflows/outflows to be combined with future expected cash inflows/outflows in order to give a more accurate picture of a company's current financial condition.

In this sense, accrual accounting can be viewed as trading off between the two problems related to realized cash flows and prediction about future cash flows: relevance and reliability (Watts and Zimmerman, 1986; Ball et al., 1991; SFAC No. 2). This means that earnings should enhance the performance measurement compared to realized cash flows through accruals that, however, need to be as objective as possible thanks to definition, recognition, and measurement rules. In fact, the accrual process provides rules on the timing of cash flows recognition in earnings so that the latter will more closely reflect firm performance than the former. However, accruals are also required to be objective and verifiable through a set of standards that limits management's discretion.

2. The accrual model

The essence of accrual accounting is the use of accruals, which can be defined as adjustments to the underlying cash flows, that shift their recognition as components of income over time (Dichev, 2016)¹¹. Therefore, as suggested in the previous paragraph, the primary role of accruals is to overcome the abovementioned problems – related to the cash-basis accounting system – in measuring firm performance when economic entities are in continuous operation (Dechow, 1994).

Taking for granted that the primary product of accrual accounting is net income as a measure of performance, it must be pointed out that the two main accounting rules which guide the production of earnings are the revenue recognition principle and the matching principle. The former requires revenues to be recognized when a firm has performed all, or a substantial portion, of services to be provided and cash receipt is reasonably certain, but not necessarily collected. The latter requires expenses associated directly with revenues to be expensed in the period in which the firm recognizes the revenues, regardless of cash inflows and outflows. Based on such ground rules, the accrual process is hypothesized to mitigate timing and matching problems inherent in cash flows so that earnings more closely reflects the firm performance.

Dechow et al. (1998) formally model the accrual accounting process, relying on operating cash flows and the process by which operating cash flows forecasts are

¹¹ Notice that this formulation is equivalent to the often-used derivation of accruals as the changes in the assets and liabilities of the firm because of the relation between the balance sheet and the income statement.

embedded into earnings¹². Their model also explains why changes in operating cash flows have negative serial correlation – as shown by Dechow (1994) – and how earnings incorporate such a negative serial correlation to become a better forecast of future operating cash flows than current operating cash flows.

Unlike Dechow (1994), the starting point of Dechow et al. (1998) is represented by the sales generating process rather than the cash flow generating process because sales contracts determine both the timing and the amount of cash inflows (and, often, related cash outflows), and the recognition of earnings¹³. Assuming that sales for a certain period follow a random walk route¹⁴, it can be state that:

$$S_t = S_{t-1} + \varepsilon_t \quad (\text{Eq. 3})$$

where S represents the amount of sales made during the accounting periods t and $(t - 1)$, and ε_t is a random variable, with variance σ^2 and covariance $(\varepsilon_t, \varepsilon_{t-\tau}) = 0$, for $|\tau| > 0$, that summarize the random walk assumption.

¹² Even if the authors enrich the basic model in order to include the effect of fixed costs, Dechow (1994) shows that certain accruals are less likely to mitigate timing and matching problems in realized cash flow, and presents evidence indicating that long-term operating accruals play a less important role in this respect. In addition, according to Dechow et al. (1998), accruals' effects on both the time-series properties of earnings and the predictability of future cash flows are likely to be more readily observable for working capital accruals. This is why, for the majority of firms, the cycle from the outlay of cash for purchases to receipt of cash from sales (which can be called the 'operating cash cycle') is shorter than the cycle from the outlay of cash for long-term investments to receipt of cash inflows from them (the 'investment cycle'). This means that working capital accruals (primarily accounts receivables, accounts payables, and inventories) tend to shift operating cash flows across adjacent years so that their effects are observable in first-order serial correlations and one-year-ahead forecasts.

¹³ According to the authors, sales contract specifies when and under what conditions the customer has to pay. Consequently, those conditions determine the pattern of cash receipts and so the sales contract can be considered 'more primitive' than the cash receipts. Moreover, sales conditions also determine when a future cash inflow is verifiable and so included in earnings (along with associated cash outflows).

¹⁴ Ball and Watts (1972) reports that the evidence of independence in income changes is compelling, confirming earlier researches of (among others) Little (1962), Rayner and Little (1966), Lintner and Glauber (1967), Brealey (1967, 1969), Fama and Babiak (1968). However, note that some studies have documented some deviations from the random walk process – see, for example, Brook and Buckmaster (1976), Finger (1994), and Ramakrishnan and Thomas (1998).

Given that the relation between sales and cash flow from sales is not necessarily one-to-one, because some sales could have a deferred payment¹⁵, Dechow et al. (1998) assume α as the proportion of sales that will be uncollected at the end of the reference period (t) so that accounts receivables (AR) can be defined as:

$$AR_t = \alpha S_t \quad (\text{Eq. 4})$$

Relaying on the previous definition of accruals, it has to be noted that the accounts receivables are an accrual component which incorporates future cash inflow forecasts (collection of accounts receivables) into earnings, since they allows to recognize revenues generated from sales – made during the reference accounting period – regardless of the associated cash collection. Therefore, imaging a new firm which has nothing but revenues from sales, the earnings of the period (E_t) is represented by the whole revenues from realized sales:

$$E_t = S_t \quad (\text{Eq. 5})$$

Splitting the cash component of earnings from the accrual one, the previous relation becomes:

$$E_t = (1 - \alpha)S_t + \alpha S_t \quad (\text{Eq. 6})$$

where the first term represents the cash component of earnings, while the second terms stands for the accrual component.

After that, Dechow et al. (1998) introduce expenses that, in an early stage, are assumed to vary with sales. So expenses for the reference period (Exp_t) are:

$$Exp_t = (1 - \pi)S_t \quad (\text{Eq. 7})$$

¹⁵ Following the cash-basis accounting and imaging a firm which is unprecedented and has nothing but those sales, the income of the period should be computed as: $E_t = (1 - \alpha)S_t = Cash_t$.

where π represents the net profit margin on sales.

Consequently, including expenses in the computation of the income of the reference period, Eq. 5 turns into:

$$E_t = S_t - Exp_t = S_t - (1 - \pi)S_t = \pi S_t \quad (\text{Eq. 8})$$

However, as seen for sales, the relation between expenses and cash flow from expenses is not necessarily one-to-one, because of two reasons: inventory policies and deferred payments.

The former, in fact, give birth to differences between expense and cash outlays and, consequently, between earnings and cash flows. Explicitly, if a specific cost is likely to be recovered in the future, it is capitalized and excluded from the expenses of the period because the associated future cash proceeds were not verifiable and so were not included in earnings. In order to enrich their model, Dechow et al. (1998) assume that inventory at the end of the reference period depends on a target level and on a deviation from that target. The target inventory is defined as a constant fraction (γ_1) of the cost of sales expected for the next period and can be viewed as: $\gamma_1(1 - \pi)S_t$ where $\gamma_1 > 0$.

Once defined the target inventory, it should be noted that, since the model assumes that sales follow a random walk, the target will be maintained if a firm modifies its inventory in response to changes in sales: $\gamma_1(1 - \pi)\Delta S_t$ where $\Delta S_t = S_t - S_{t-1} = \varepsilon_t$.

However, real inventory could deviate from the target, if actual sales differ from forecasts and there is an inventory build up or liquidation. Such a deviation from the target can be formalized as: $\gamma_2\gamma_1(1 - \pi)[S_t - E_{t-1}(S_t)] = \gamma_2\gamma_1(1 - \pi)\varepsilon_t$ where γ_2 stands for a constant that captures the speed with which inventories are

retrieved to the target level: if $\gamma_2 = 0$ there is no deviation from the target, while if $\gamma_2 = 1$ it means that a deviation from the target is detected but the firm does not undertake any adjustments.

Once defined the target inventory and its potential distortions, Dechow et al. (1998) define inventory policies (INV) for the reference period as:

$$INV_t = \gamma_1(1 - \pi)S_t - \gamma_1\gamma_2(1 - \pi)\varepsilon_t \quad (\text{Eq. 9})$$

where the first term of the equation is the target inventory, and the second term represents the extent to which the firm fails to reach that target inventory¹⁶.

Combining Eq. 9 with Eq. 7, which is related to the expenses, a measure of the magnitude of purchases (P) for the reference period can be obtained:

$$P_t = (1 - \pi)S_t + \gamma_1(1 - \pi)\varepsilon_t - \gamma_1\gamma_2(1 - \pi)\Delta\varepsilon_t \quad (\text{Eq. 10})$$

If a firm adopt the ‘just in time’ philosophy, thanks to which inventory is zero ($\gamma_1 = 0$), purchases will be equal to the expenses for the reference period [$P_t = (1 - \pi)S_t$]. Analyzing Eq. 10, it can be also noted that the second term represents the purchases that are necessary to adjust the inventory level for changes in the target inventory, while the third term stands for the purchases which embody the deviation from the target¹⁷.

¹⁶ Barth et al. (2001) state that although the inventory assumptions could not completely reflect the policies of real firms, they are able to highlight that not all accruals reverse in a single period and that accruals convey more information than simply the one-period delayed payments or receipts associated with past purchases or sales.

¹⁷ Barth et al. (2001) note that γ_2 represents the portion of the current sales shock (ε_t) that are not included in the inventory of the current period because it is deferred to the next one. Therefore, current period purchases should consists of current period cost of sales, plus the combined effect of the current adjustment for sales shock of the period and lagged adjustments for the prior sales shock: $P_t = (1 - \pi)S_t + \gamma_1(1 - \pi)[(1 - \gamma_2)\varepsilon_t + \gamma_2\varepsilon_{t-1}]$.

However, as well as sales, purchases could have a deferred payment which implies that the second factor causing a difference between purchases and their cash flows is the credit terms for purchases. Therefore, if β is assumed to be the portion of purchases that remains uncollected at the end of the reference period, accounts payables (AP) for the reference period can be defined as:

$$AP_t = \beta P_t = \beta[(1 - \pi)S_t + \gamma_1(1 - \pi)\varepsilon_t - \gamma_1\gamma_2(1 - \pi)\Delta\varepsilon_t] \quad (\text{Eq. 11})$$

As the accounts receivables, accounts payables represent an accrual component which incorporates future cash outflow forecasts (payment of accounts payables) into earnings, since they allow to recognize purchases regardless of the associated cash disbursement.

Combining cash proceeds from sales and cash outlays for purchases, and also considering the cash inflows and outflows inherited from the previous period, the net cash flow (CF) for the reference period can be computed as:

$$\begin{aligned} CF_t = & [(1 - \alpha)S_t + \alpha S_{t-1}] \\ & - \{(1 - \beta)[(1 - \pi)S_t + \gamma_1(1 - \pi)\varepsilon_t - \gamma_1\gamma_2(1 - \pi)\Delta\varepsilon_t] \\ & - \beta[(1 - \pi)S_{t-1} + \gamma_1(1 - \pi)\varepsilon_{t-1} - \gamma_1\gamma_2(1 - \pi)\Delta\varepsilon_{t-1}]\} \end{aligned}$$

which means that

$$\begin{aligned} CF_t = & \pi S_t - [\alpha + (1 - \pi)\gamma_1 - \beta(1 - \pi)]\varepsilon_t \\ & + \gamma_1(1 - \pi)[\beta + \gamma_2(1 - \beta)]\Delta\varepsilon_t + \beta\gamma_1\gamma_2(1 - \pi)\Delta\varepsilon_{t-1} \quad (\text{Eq. 12}) \end{aligned}$$

where the first term of the equation represents the firm's earnings for the reference period¹⁸, while the remaining three terms consist of accruals.

Consequently, rearranging Eq. 12, earnings can be obtained as follow:

¹⁸ See Eq. 8.

$$E_t = CF_t + [\alpha + (1 - \pi)\gamma_1 - \beta(1 - \pi)]\varepsilon_t - \gamma_1(1 - \pi)[\beta + \gamma_2(1 - \beta)]\Delta\varepsilon_t - \beta\gamma_1\gamma_2(1 - \pi)\Delta\varepsilon_{t-1} \quad (\text{Eq. 13})$$

Looking at Eq. 13, it can be noted that if sales and purchases do not have deferred payments ($\alpha = 0$ and $\beta = 0$) and there are no inventories ($\gamma_1 = 0$), earnings will be equal to realized cash flow for the reference period ($E_t = CF_t$).

The remaining three members of Eq. 13 consist of accruals for the reference period, expressed as a function of both current sales shock, and differences in current and lagged sales shocks. In particular, the second term represent the temporary cash flow related to the change in expected long-term working capital. It is due to the sales shock for the reference period (ε_t) weighted by a measure of the expected long-term operating cash cycle, which is expressed as a fraction of the period $-\alpha + (1 - \pi)\gamma_1 - \beta(1 - \pi)$ – and that Dechow et al. (1998) denote as δ ¹⁹. The third and the fourth members of Eq. 13, instead, represent temporary cash flows due to the lagged adjustments in inventory and credit terms. As empirically shown by Dechow et al. (1998), the coefficients of the differences in sales shocks in the third and fourth terms are close to zero and do not affect the relative predictive ability or the predicted signs of the correlations. Therefore, the

¹⁹ The operating cash cycle expressed as a fraction of the period is the portion of annual sales in receivables plus the portion of annual cost of goods sold in inventory minus the portion of annual cost of goods sold in payables (see for example, Ross et al., 1993). Usually, averages of receivables, inventories and payables and annual amounts of sales and cost of goods sold are used in the calculation. However, the Dechow et al. (1998) measure of δ differs from the typical calculation in three ways: (i) it uses the expected year-end values of receivables, inventory and payables rather than averages for the year; (ii) receivables are expressed as fractions of expected annual sales rather than actual annual sales; (iii) inventories and payables are expressed as fractions of expected annual sales rather than of annual cost of goods sold. The portion of expected sales in expected receivables for the reference period is $\alpha S_{t-1}/S_{t-1} = \alpha$, while the expected inventory at the end of the reference period is $\gamma_1(1 - \pi)S_{t-1}$. Consequently, expected inventory as a portion of expected sales is $\gamma_1(1 - \pi)S_{t-1}/S_{t-1} = \gamma_1(1 - \pi)$. Finally, expected accounts payable as a portion of expected sales can be defined as $\beta(1 - \pi)S_{t-1}/S_{t-1} = \beta(1 - \pi)$.

authors decide to ignore the last two terms of Eq. 12 and Eq. 13. In this way, they had a parsimonious view of cash flow and earnings, which can be computed as:

$$CF_t = \pi S_t - \delta \varepsilon_t \quad (\text{Eq. 14})$$

and

$$E_t = CF_t + \delta \varepsilon_t \quad (\text{Eq. 15})$$

Eq. 14 and Eq. 15 highlight that, under accrual accounting, current cash flow does not coincide with current earnings ($CF_t \neq E_t$). Indeed, current earnings consists of current cash flows adjusted by accruals, which allow to overcome the already mentioned timing and matching problems. Moreover, since accruals embody all temporary cash flows, they can also be considered as a forecast of future cash flows. In this way, earnings could be generally deemed a better firm performance measure than realized cash flows.

However, Barth et al. (2001), in attempting to extend Dechow et al. (1998), highlight that the parsimonious relation between cash flows and earnings in Eq. 14 and Eq. 15 leaves out the incremental role that accruals can play in predicting future cash flows, causing earnings not to be an unbiased estimator of future cash flows. Therefore, Barth et al. (2001) modeled next period cash flow as the cash inflows from sales, adjusted for the relative uncollected amounts reflected in the change in accounts receivables, minus outflows from purchases, adjusted for unpaid amounts reflected in the change in accounts payables:

$$CF_{t+1} = (S_{t+1} - \Delta AR_{t+1}) - (P_{t+1} - \Delta AP_{t+1}) \quad (\text{Eq. 16})$$

Following Eq. 13 through Eq. 15, Eq. 16 can be rewritten as:

$$\begin{aligned}
CF_{t+1} = & \pi_t S_{t+1} - [\alpha + (1 - \pi)\gamma_1 - \beta(1 - \pi)]\varepsilon_{t+1} \\
& - \gamma_1(1 - \pi)[\beta + \gamma_2(1 - \beta)]\Delta\varepsilon_{t+1} \\
& + \beta\gamma_1\gamma_2(1 - \pi)\Delta\varepsilon_t
\end{aligned} \tag{Eq. 17}$$

Moreover, unlike Dechow et al. (1998), Barth et al. (2001) do not assume that the coefficients of the differences in sales shocks in the third and fourth terms of Eq. 12 are close to zero, as they do not affect the relative predictive ability. Specifically, according to Barth et al. (2001):

$$E_t(\Delta\varepsilon_{t+1}) = -\varepsilon_t \tag{Eq. 18}$$

and

$$E_t(\Delta\varepsilon_t) = \varepsilon_t - \varepsilon_{t-1} \tag{Eq. 19}$$

where ε_t and ε_{t-1} represent the realizations of the periods t and $t - 1$'s random variable ε , which only equals 0 by chance.

Therefore, by using Eq. 17 to express expected next period cash flows as a function of current and two lags earnings, Barth et al. (2001) show that, thanks to the contribution these terms, expected next period cash flow does not equal current earnings:

$$\begin{aligned}
E_t(CF_t) = & \pi_t S_t - \gamma_1(1 - \pi)[\beta + \gamma_2(1 - \beta) - \beta\gamma_2]\varepsilon_t \\
& - \beta\gamma_1\gamma_2(1 - \pi)\varepsilon_{t-1}
\end{aligned} \tag{Eq. 20}$$

However, bearing in mind that:

- $E_t = \pi S_t$
- $S_t = S_{t-1} + \varepsilon_t$
- $\varepsilon_t = \pi^{-1}(E_t - E_{t-1})$
- $\varepsilon_{t-1} = \pi^{-1}(E_t - E_{t-1})$

then, Eq. 20 can be rewritten in terms of earnings:

$$\begin{aligned}
E_t(CF_t) &= \{1 - \gamma_1(1 - \pi)\pi^{-1}[\beta + \gamma_2(1 - \beta) - \beta\gamma_2]\}E_t \\
&\quad + \gamma_1(1 - \pi)\pi^{-1}[\beta + \gamma_2(1 - \beta) - \beta\gamma_2]E_{t-1} \\
&\quad + \gamma_1(1 - \pi)\pi^{-1}\beta\gamma_2E_{t-2} \quad (\text{Eq. 21})
\end{aligned}$$

According to Barth et al. (2001), Eq. 21 highlights that expected next period cash flow equals current earnings, adjusted for the one- and two-year effects of inventory changes and associated payments²⁰. Moreover, since next period cash flow is expected to differ from current period cash flow because of the transactions involving current period accruals, next period cash flow can also be expressed in terms of components of current earnings:

$$E_t(CF_{t+1}) = CF_t + \Delta AR_t - \Delta AP_t - (1 - \beta)[E_t(\Delta INV_{t+1}) - \Delta INV_t] \quad (\text{Eq. 22})$$

Looking at Eq. 22, it should be also noted that earnings can overstate expected future cash flows as a result from business performance deviating from expectations²¹.

Thus, relying on the modified Dechow et al. (1998) by Barth et al. (2001), expected cash flows can be expressed as a function of either current and up to two lags of aggregate earnings, or as current earnings disaggregated into cash flow and components of accruals, with each having equal predictive ability. Therefore,

²⁰ For instance, if the two prior years' sales changes (ε_t and ε_{t+1} are positive), then E_t overstates expected cash flows in period $t + 1$ because E omits the future cash flow effects of payments related to delayed inventory increases. In this case, CF_{t+1} will be less than E_t because of payments related to (1) the period $t + 1$ inventory increase arising from the period t sales increase, (2) the period t accounts payable for the period t inventory increase arising from the period t sales increase, and (3) the period t accounts payable for the period t inventory increase arising from the period $t - 1$ sales increase.

²¹ The reversal of earnings can also be explained by business performance deviating from expectations (see, for example, Teoh et al., 1998)

accruals not only reflect delayed cash flows effects of past transactions, but also convey information about expected future cash flows relating to management's expected future purchasing activities (for example, inventory), as well as collections and payments associated with current period transactions (for instance, collecting accounts receivables and paying accounts payables).

3. Accruals issues

While the above-mentioned models and thesis may help to appreciate the economics of accruals, the real world could be (sometimes far) messier than the stylizations. In fact, there are many factors which can lead accruals to be useful as well as useless, depending upon circumstances.

First of all, relying on studies which analyze the role of accruals in mitigating the cash-basis accounting's problems, it should be noted that since accounting rules do not allow the recognition of all future cash flows, in practice, it is expected that accruals empirically reduce the serial correlation in cash flows, but not eliminate it. Thus, according to Dechow (1994), earnings will also suffer from timing and matching problems over short time intervals but to a lesser extent than realized cash flows, while over longer reference period earnings (and accruals) and cash flow tend to provide the same information.

Moreover, it has been also questioned (for example, Brealey and Myers, 1981; Treynor, 1972) the reliability and relevance of earnings because of its accrual components. Specifically, some scholars argue that it is difficult to compare earnings across firms because of the variety of methods used to calculate accrual items. Moreover, the use of accruals introduces a new notable set of problems,

related to the managerial discretion embedded in their recognition. In particular, such a discretion could be used to signal private information, but also to opportunistically manipulate earnings. Obviously, since management most likely have superior information about the firm, the signaling aspect is expected to improve the ability of earnings in measuring firm performance (Holthausen and Leftwich, 1983; Watts and Zimmerman, 1986; Holthausen, 1990; Healy and Palepu, 1993). Therefore, a credible signal will improve the accruals usefulness, by reducing information asymmetry, and will result in more efficient contracting processes. However, to the extent to which managers use their discretion in order to opportunistically manipulate accruals, earnings will become a less reliable performance measure and cash flows could become more useful.

This means that, in order to be useful, accruals are essentially required to be as objective and verifiable as possible, through a set of standards that limits management's discretion. Therefore, the concern that managers will use their information advantage to opportunistically manipulate accruals is consistent with the allowable set of accruals being limited by accounting conventions (Watts and Zimmerman, 1986). In fact, since management manipulation is not always detectable (at least over short measurement intervals), contracting parties desire a performance measure that is reliable (and verifiable by auditors) so that there are bounds on the manipulation that can occur (Dechow, 1994). Obviously, this will reduce the usefulness of reported earnings in circumstances where management has private information concerning firm performance and could reveal this information through reported earnings. However, this will also reduce the possibility that management can provide false information for private gains.

Thus, if existing accruals are the outcome of efficient contracting, then accruals, on average, will improve the ability of earnings to measure firm performance relative to realized cash flows. Alternatively, if the dominant effect of accruals is to provide management with flexibility to manipulate earnings, then realized cash flows will provide a relatively more useful summary measure of firm performance, at least over short measurement intervals.

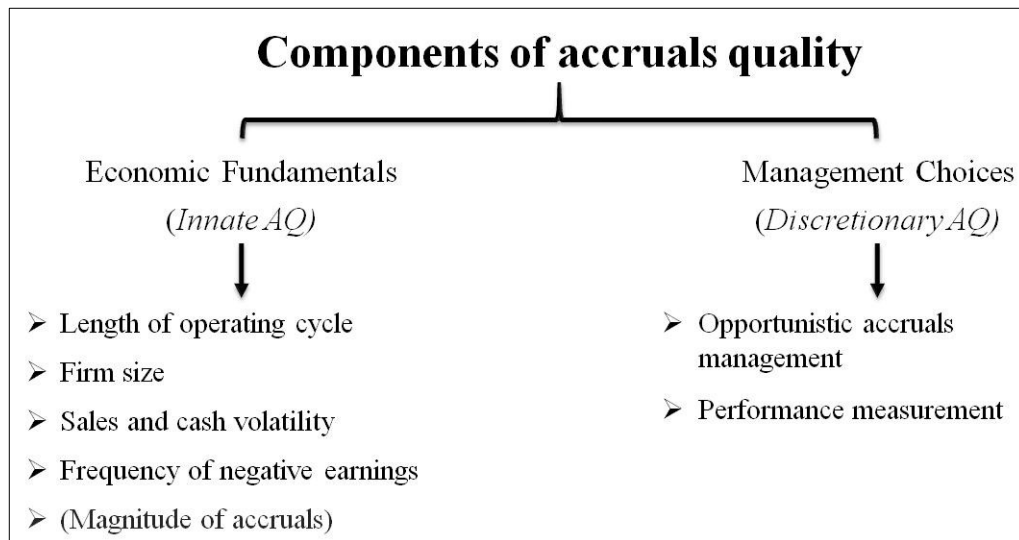
3.1 Accrual quality and its determinants

As mentioned in previous paragraphs, earnings can be a useful performance measure as well as a useless one, depending on some intrinsic characteristics of accrual accounting and other factors that can affect the quality of accruals. Therefore, it seems necessary trying to specifically analyze and understand what are the main sources of accrual quality.

Specifically, the quality of accruals can be influenced by both firm's economic fundamentals, such as their business model and operating environment, and the managerial discretion embedded in their recognition.

In particular, such aspects has been first systematized together in the same study by Francis et al. (2005). The authors, in their attempt to investigate whether investors price accruals quality, distinguish two basic source of accruals quality that they define as innate (i.e., driven by the firm's business model and operating environment) or discretionary (i.e., subject to management interventions). Following Dechow and Dichev (2002), Francis et al. (2005) identify several summary indicators of the firm's operating environment or business model, that can affect the quality of accruals, which they define as the innate component of accrual quality: firm size, standard deviation of cash flows, standard deviation of

revenues, length of operating cycle, and frequency of negative earnings realizations. At the same time, relying on prior research on discretionary accruals (Guay et al., 1996; Subramanyam, 1996), they suggests that, in broad samples, discretionary accruals choices are likely to reflect both opportunism (which exacerbates information risk) and performance measurement (which mitigates information risk).



3.1.1 Innate accrual quality

Dechow and Dichev (2002) use the standard deviation of the residuals from their model²² as a firm-specific measure of accrual quality, where a higher standard deviation signifies lower quality which lead to higher estimation errors. However, since they assume that the realization of individual estimation errors is random, the average magnitude of such errors is likely to be systematically related to some firm's characteristics. Therefore, according to the authors, it is valuable to identify observable firm characteristics which affect accrual quality and that act as

²² In order to obtain a practical measures of working capital accrual quality, they start from the following firm-level time-series model: $\Delta WC_t = \beta_0 + \beta_1 CFO_{(t-1)} + \beta_2 CFO_t + \beta_3 CFO_{(t+1)} + \varepsilon_t$, where ΔWC stands for changes in working capital, and CFO is cash flow from operations.

instruments for the propensity to make estimation errors. For this purpose, Dechow and Dichev (2002) suggest that²³:

- *The longer the operating cycle, the lower accrual quality.*

Longer operating cycles indicate more uncertainty, more estimation and errors of estimation, and therefore lower quality of accruals.

- *The smaller the firm, the lower accrual quality.*

According to the authors large firms have more stable and predictable operations and, therefore, fewer and smaller estimation errors. In addition, large firms are likely to be more diversified and, therefore, various portfolio effects across divisions and business activities reduce the relative effect of estimation errors.

- *The greater the magnitude of sales volatility, the lower accrual quality.*

Sales volatility indicates a volatile operating environment and the likelihood of greater use of approximations and estimations, with corresponding large errors of estimation and low accrual quality.

- *The greater the magnitude of cash flow volatility, the lower accrual quality.*

High standard deviation of cash flows is another measure of high uncertainty in the operating environment.

- *The greater the magnitude of accrual volatility, the lower accrual quality.*

Since the accrual quality measure is derived as a residual from accruals, accrual volatility and accrual quality are partly related by construction.

- *The greater the magnitude of earnings volatility, the lower accrual quality.*

²³ Cfr. Dechow and Dichev (2002), pp. 46-47.

Earnings is the sum of cash flows and accruals. Since the volatility of both components is predicted to be negatively related to earnings quality, they expect that greater volatility in earnings signifies lower accrual quality.

- *The greater the frequency of negative earnings, the lower accrual quality.*

Losses signal negative shocks in the firm's operating environment. Accruals made in response to such shocks are likely to involve substantial estimation errors. Thus, frequent losses are indicative of low accrual quality.

- *The greater the magnitude of accruals, the lower accrual quality.*

More accruals indicate more estimations and errors of estimation, and therefore lower quality of accruals.

Following the proposed theoretical framework, Dechow and Dichev (2002) conclude that accrual quality is negatively related to the absolute magnitude of accruals, the length of the operating cycle, the loss incidence, and the volatility of the operating environment (as proxied by the standard deviation of sales, cash flows, accruals, and earnings), and positively related to firm size.

The first evaluation of the innate component of accrual quality has been proposed by Francis et al. (2005). Specifically, in their attempt to investigate whether investors price accruals quality by analyzing the relation between accruals quality and the costs of debt and equity capital, the authors implemented two approaches to disentangle the costs of capital effects attributable to the discretionary and to the innate components of accruals quality.

As reported in Francis et al. (2005), the first approach (Method 1) explicitly separates the innate and discretionary components of accruals quality using annual

regressions of accrual quality²⁴ on the innate factors²⁵. The predicted values from each regressor of their model yield an estimate of the innate portion of accrual quality, while the error prediction is the estimate of the discretionary component of accruals quality. On the other hand, the second approach (Method 2) directly controls for innate factors affecting accruals quality by including them as independent variables in their costs of capital tests. In these augmented regressions, the coefficient of the variable relative to the accrual quality captures the cost of capital effect of the portion of accruals quality that is incremental to the effect captured by the innate factors, which can be separately evaluated²⁶.

3.1.2 Discretionary accrual quality

Beside the firm specific characteristics assumed as the innate constituent of accrual quality, the other element that is assumed to affect accrual quality is represented by managerial choices and, therefore, is defined as the discretionary constituent of accrual quality. According to Guay et al. (1996), the discretionary component of accruals quality contains up to three distinct subcomponents. The performance subcomponent, which reflects management's attempts to enhance the ability of earnings to reflect performance in a reliable and timely way, increase the quality of accruals and, therefore, would be expected to reduce information risk. The second and third subcomponents, which reflect opportunism and pure noise, respectively, reduce accrual quality and, consequently, would be expected to increase information risk. However, while Guay et al. (1996) suggest that the

²⁴ Francis et al. (2005) relies on Dechow and Dichev (2002) for the accrual quality model.

²⁵ $AQ_{it} = \beta_0 + \beta_1 Size_{it} + \beta_2 \sigma Sales_{it} + \beta_3 \sigma CFO_{it} + \beta_4 OperCicle_{it} + \beta_5 NegEarn_{it} + \varepsilon_{it}$

²⁶ Cfr. Francis et al. (2005), pp. 316-319.

performance and opportunism subcomponents dominate the noise component, their empirical results do not clearly point to either the performance effect or the opportunistic effect as being empirically stronger. Nevertheless, their discussion of results, combined with Healy's (1996) discussion of their paper, suggests that, given that managerial discretion over accruals has survived for centuries, the net effect of discretionary accruals is probably to enhance earnings as a performance indicator²⁷. According to this point of view, the discretionary component of accruals quality reduces information risk. Anyway, Guay et al. (1996) also note, as does Healy (1996), that broad samples covering long time periods will contain both accruals that conform to the performance hypothesis and accruals that are driven by managerial opportunism. Specifically, Healy (1996) notes that especially in a cross-section of firms, management of one firm can report opportunistically and management of another one can report unbiasedly (with both behaviors potentially shifting over time), with the result that the overall observed effect, for a given sample, will be a weighted average of separate effects. That is, while performance effects might be expected to dominate when management does not face incentives to engage in opportunistic behaviors, previous research provides evidence that opportunistic effects dominate in carefully selected, non-random samples where incentives for opportunistic behaviors are strong. This reasoning implies that discretionary accruals quality is expected to have effects that reflect some mixture of performance improvement (which will offset any negative effect associated with innate accruals quality factors) and opportunism plus noise (which will exacerbate these factors).

²⁷ See also Subramanyam (1996).

Relaying on these issues, the accounting literature have been marked by some events that have had a major impact on the knowledge and the understanding of earnings management and, therefore, about the discretionary component of accruals quality. According to Ronen and Yaari (2008)²⁸ these milestones can be divided into three main areas: theoretical research contributions, empirical research contributions, and regulatory innovations²⁹.

On the theoretical front, new insights have been provided by the penetration of game-theory tools into accounting, including studies by the following:

- Lambert (1984), examines real smoothing, a strategy whereby management uses its flexibility in making investment and production decisions to reduce the variability of the firm's total value. Lambert models real smoothing as the outcome of the principal-agent relationship.
- Dye (1988), rationalizes the internal and external demand for cosmetic earnings management. The internal demand follows from the principal-agent relationship between the firm's owners and the management, and the external demand follows from the capital market's need to price the firm.
- Dye (1985a), Arya et al. (1998, 2003), and Ronen and Yaari (2002), challenge the applicability of the Revelation Principle. The Revelation Principle is a game-theory tool that states that whatever the equilibrium of a game in which players have private information, there is no loss of generality in restricting analysis to another equilibrium in which players

²⁸ Crf. Ronen and Yaari (2008), pp. XVI-XVII.

²⁹ For other reviews relative to earnings management topics, see also Schipper (1989), Healy and Wahlen (1999), Stolowy and Breton (2000), McNichols (2000), Beneish (2001) Fields et al. (2001).

reveal the truth. The Revelation Principle puts a question mark on the value of a formal analysis of earnings management.

- Sankar (1999), Ronen and Yaari (2001, 2002), and Ronen et al. (2003), among others, examine the effect of earnings management on the magnitude of the earnings response coefficient, voluntary disclosure, and the demand for additional information.

In empirical research, shifting attention to instances earnings management has been fruitful, the following are noteworthy:

- Healy (1985), shows that compensation contracts may induce management to take measures to decrease reported income when it cannot increase its bonus, thus hoarding reported income.
- Schipper (1989), provides a discussion of the different definitions of earnings management and critically summarizes recent empirical developments. Her commentary appeared after a Journal of Accounting Research conference, Studies on Management's Ability and Incentives to Affect the Timing and Magnitude of Accounting Accruals. The most cited paper from this conference in the earnings management literature is by McNichols and Wilson (1988), on manipulation of the bad-debt expense.
- Jones (1991) separates discretionary accruals from non-discretionary accruals when she examines the demand of regulators for the earnings numbers during import relief investigations. The same approach to detect earnings management has been examined further by Dechow et al. (1995), Bartov et al. (2000), Dechow and Dichev (2002), Kang (2005), Kothari et al. (2005), Ye (2006), Yaari et al. (2007).

However, earnings management activities aiming at obfuscating firms' performance are only one driver of discretionary accruals. Managers may strategically exercise discretion over earnings to convey private information to outside investors and mitigate market frictions. Theoretical models stress the strategic role of discretionary accruals to unblock private information and to positively impact on firm's stock prices (Demschi and Sappington, 1987; Demski and Sappington, 1990; Guay et al., 1996; Demski, 1998; Arya et al., 2003). Subramanyam (1996) confirms the signaling hypothesis and finds a positive correlation between stock returns and unexpected accruals. Researches in the banking industry show a positive relationship between abnormal loan loss provisions and stock returns (Wahlen 1994; Beaver and Engel, 1996). Louis and Robinson (2005) collect strong evidence suggesting that managers use discretionary accruals in conjunction with stock splits to convey their private information. Finally, Linck et al. (2013) provide supporting evidence about the strategic use of discretionary accruals by financially constrained firms to credibly signal positive prospects.

Finally, at the regulatory level, the following events can be considered significant developments in terms of discretionary accruals:

- The 1998 'Numbers Game' speech by the then chief commissioner of the Securities and Exchange Commission, Arthur Levitt Jr., which foreshadowed the subsequent regulatory measures to improve the quality of accounting earnings, including SAB 99 (materiality), SAB 100 (timing and recognition of restructuring), and SAB 101 (revenues recognition).

- The Sarbanes-Oxley Act of 2002, which created the Public Company Accounting Oversight Board, an independent body responsible for the issuance of audit and ethics standards that effectively replaced the self-regulation of accountants.
- Increased monitoring of accountants and accounting statements, including extension of the SEC staff by about 800 people.
- The mandatory IFRS adoption in the majority of the biggest European countries and other ones all around the world, starting from 2005. Since they are accounting standards highly principles-based, this event kicked off to a huge stream of research on the impact of IFRS adoption on earnings management, and accrual and earnings quality.

CHAPTER II

The Usefulness of Performance Measures: an Empirical Review

1. The noise reducing role of accruals

Previous paragraphs try to formalize the idea that a reporting system based on realized cash flows suffers from timing and matching problems which cause them to be a noisy measure of firm performance, and that earnings seems to be a better firm performance measure thanks to the role played by accruals. In addition to the theoretical arguments reported by Paton and Littleton (1940) and Ball et al. (1991) who support such a thesis, some other studies try to empirically investigate this topic. In particular, the negative contemporaneous association between operating cash flows and total accruals – which can be considered the proof that the central role of accrual accounting is to smooth out random fluctuations in cash flows – is observed going back to some of the earlier studies on accrual accounting, such as those of Rayburn (1986) and McNichols and Wilson (1988)³⁰. Later, other researchers continue in investigating the association between accruals and cash flow in a more systematic fashion.

Dechow (1994) examines the role of accruals in mitigating the noise in transitory cash flows in order to obtain earnings. Specifically, she highlights that, over short time intervals, cash flows have more negative realizations and higher standard

³⁰ Rayburn (1986) observes a Pearson correlation of -0.81 between the level of cash flows from operations and total accruals, while McNichols and Wilson (1988) exhibit a Spearman correlation of -0.69 (-0.78) between the levels (changes) of the two variables.

deviation than earnings. This means that accruals off-set extreme cash inflows and outflows associated with mismatched cash receipts and disbursements over a short reference period. Over longer intervals, instead, both the standard deviation and the proportion of negative realizations of cash flow decline relative to earnings as timing and matching problems in cash flows become less severe.

Moreover, following the analysis of cash flows' time-series properties consistent with them suffering from timing and matching problems³¹, she demonstrates that, since accruals are used to match cash proceeds and outlays associated with the same economic event, changes in accruals exhibit a negative autocorrelation and that accruals are negatively correlated with changes in cash flows, given that the latter are expected to be temporary. Evidence in this sense is also provided by Sloan (1996), who shows a negative relation between accruals and cash flows in his attempt to investigate the accruals and cash flow components of earnings.

Further, Dechow and Dichev (2002) extend the noise reducing role of accrual accounting, introducing a measure that capture the mapping of current accruals into last period, current period, and next period cash flows. Specifically, their evidence highlights that there is a strong negative association between working capital accruals and contemporaneous operating cash flows, while the relation between current accruals and past/future cash flows is positive.

In addition, Dechow (1994) also demonstrates that the autocorrelations of changes in accruals and the association between current accruals and cash flows will be more negative over short time intervals when timing and matching problems are more acute. In fact, over longer periods, as the temporary components in cash

³¹ See Par. 1, Chapter I.

flows ‘cancel each other out’, changes in earnings and in cash flow will have a higher positive correlation with each other (if clean surplus holds). These results are consistent with the matching principle, since accruals ‘smooth’ the temporary components in cash flows. In fact, evidence that earnings better reflects firm performance than does cash flows would be consistent with the negative correlation being due to matching. Finally, she also demonstrates that when the magnitude of accruals increases, indicating that the firm has large changes in its operating, investment, and financing activities, cash flows suffer more from timing and matching problems. This is consistent with the length of the operating cycle being an economic determinant of the volatility of working capital.

In that seems to be the natural development of the previous Dechow’s work (1994), Dechow et al. (1998) also explain why operating cash flow changes have negative serial correlation and how earnings incorporate the negative serial correlation to become a better forecast of future operating cash flows than current operating cash flows. Specifically, relying on their model, they demonstrate that the serial correlation pattern is the net result of two effects. The first one is due to the spreading collection of net cash generated by the profit on the reference period sales shock across contiguous periods which – *ceteris paribus* in the timing of cash inflows and outflows – entails a positive serial correlation in cash flow changes. However, in the absence of the first effect, the second one leads to a negative serial correlation in cash flow changes because of the differences in the timing of cash inflows and outflows. This means that, the timing effect dominates the profit-spread effect, in such a way that the negative serial correlation in

operating cash flow changes is generated by the length of the operating cycle (and so in working capital, having a positive net investment).

Moreover, Dechow et al. (1998) also investigate the negative correlation between cash flow and accruals showing that increases (decreases) in sales generate contemporaneous outlays (inflows) for working capital increases (decreases) that are followed in the next period by cash inflows (outflows). The result of such a process is a negative serial correlation in cash flow changes with accruals that excludes the contemporaneous one-time outflows for working capital from the current period's earnings and incorporates forecasts of future cash inflows. This generates a negative serial correlation in accrual changes that off-sets the negative serial correlation in operating cash flow changes³² in order to obtain serially uncorrelated earnings changes.

Finally, it is also interesting to note that the empirical evidence of their analysis highlights a broad spread in the distribution of the correlation between earnings and cash flow, while the correlation of the first differences of accruals and cash flows do not show a wide variance. Therefore, the role of accruals is to chamfer timing and matching problems in earnings, implying that the correlation between accruals and cash flows does not exhibit such a wide spread.

Similar results are also reported in, among others, Givoly and Hayn (2000), Dichev and Tang (2008), Barone and Magilke (2009), and Bushman et al. (2013). In particular, these studies confirm the described negative relation between current accruals and cash flows, even if they highlight a downward trend. In fact,

³² It should be noted that since historical cost earnings measurement rules do not recognize all the future cash flows, in practice, it is expected that accruals empirically reduce the serial correlation in cash flows, but not eliminate it.

although the negative association between current accruals and cash flows seems to be taken for granted in the literature, there is some sporadic evidence in studies – which analyze more recent reference periods – suggesting that the association between accruals and cash flows becomes less prominent in recent years³³.

2. The information content of accruals

The various technical aspects, examined above, describe the accrual accounting as a reporting system which is able to overcome the problems inherent in the cash-basis accounting in order to give a more accurate picture of a company's current financial position and, therefore, to enhance the performance measurement of earnings compared to realized cash flows. However, despite the truthfulness of such technical aspects, a key issue of the financial reporting activity is to provide useful information in order to enable accounting data users to produce more accurate forecasts about the future, assisting them in their decision making process. Therefore, the fact that accrual accounting and its results also provide more useful information than cash-basis accounting is an empirical matter. In fact, although it has been argued that there are some limitations related to the implementation of a completely analytical approach in assessing the usefulness of earnings and accruals³⁴, such an issue has been widely investigated over years. Specifically, two research approaches have been mainly used in order to

³³ For further details please refer to Chapter III.

³⁴ Such limitations arise from the fact that income numbers cannot be substantively defined. Therefore this lack of meaning makes them of doubtful utility. For the basic concept, for example, please refer to Canning (1929), Gilman (1939), Paton and Littleton (1940), Vatter (1947), Edwards and Bell (1961), Chambers (1964), Chambers (1966), Lim (1966), Chambers (1967), Ijiri (1967), and Sterling (1967). Moreover, according to Christensen and Demski (2003), although this is getting well ahead of the story, it is important to acknowledge that a measure might not exist but when it does, it may be far from unique.

empirically assess the usefulness of accruals and earning relative to cash flows: the first stream analyzes the ability of accounting numbers in predicting future cash flows and earnings, while the second approach focuses on the value relevance of accounting numbers in the context of capital market researches.

2.1 The predictive ability of accounting numbers

One of the methods used in order to assess the usefulness of accruals and earning relative to cash flows relies on the association between current accounting numbers and future cash flows and earnings. This research stream started with Brooks (1981) that uses time series analysis to investigate whether adding earnings information to past cash flows would enhance the predictive ability of future cash flow than would past cash flow measures alone. However, based on quarterly data for thirty companies, he does not find a general improvement in the ability to forecast future cash flow when the earnings data was added.

After Brooks (1981), two milestones, that has generated as many strands of results poles apart, were published in this field. The first one is the paper of Greenberg et al. (1986) that, in investigating whether current earnings or current cash flow is a better predictor of future cash flow, highlights that for each lag period of one to five years and for each multi-lagged period of two or three years, most companies had current earnings as a better predictor of future cash flow than current cash flow. Bowen et al. (1986), instead, conclude that their results, based on simple one- and two-period-ahead forecast model, are consistent with the idea that earnings and cash flow measures convey different signals, but are not consistent

whit the statement according to which earnings provide better forecasts of future cash flows than do cash flow numbers³⁵.

2.1.1 Pro-accruals

Following Greenberg et al. (1986) many other studies documented the primacy of accruals and earnings over cash measures in predicting future cash flows and earnings. Specifically, Murdoch and Krause (1989) examine the ability of accrual accounting and cash flow measures in predicting future cash flows both independently and in combination. Evidence show that accrual earnings are a better predictor of operating cash flows than operating cash flows themselves. This findings are also confirmed by Murdoch and Krause (1990) who focus on the ability of earnings or cash flows from operations as a better predictor of future cash flows from operations³⁶.

Lorek and Willinger (1996) use quarterly data, rather than annual amounts, and examine the incremental information provided by cash flow measures over accruals numbers, and vice versa. They find that accruals have incremental predictive ability, and suggest that the use of an industry-specific model may further improve the accuracy of the prediction process.

³⁵ In particular, their results show that the correlations between alternative measures of cash flows and earnings are low, while the correlations between traditional measures of cash flows and earnings are high. Moreover, for four out of five cash flow variables, results are consistent with the hypothesis that random walk models predict cash flow as well as (and often better than) models based on other flow variables. An exception to this general result is that net income plus depreciation and amortization and working capital from operations appear to be the best predictors of cash flow from operations.

³⁶ They also highlight that the current component of earnings included in the measurement of working capital was a better predictor than the non-current component included in measuring earnings, and that the accuracy prediction of these kind of models can be improved using a long period of data.

Keeping up on this topic, another great contribution in favour of accruals accounting was from Dechow et al. (1998). Specifically, they examine the relative predictive abilities of earnings and operating cash flow in forecasting future cash flows, and compare the model's predicted correlation structure between cash flows, earnings, and accruals with the actual correlation structure. Moreover, they test whether earnings by itself are a better forecast of future operating cash flows than current operating cash flow. Their results indicate that earnings, whether used alone or in conjunction with cash flows, are consistently incrementally useful in forecasting future cash flows at all horizons, while cash flows exhibit only modest incremental forecasting power. Therefore, they conclude that, since the difference between earnings and cash flows is accruals, earnings' forecasting power beyond cash flows is attributable to accruals.

Soon after, Barth et al. (2001) – building on the Dechow et al. (1998) – continue investigating the role of accruals in predicting future cash flows. Their model shows that disaggregating earnings into cash flow and aggregate accruals significantly increases predictive ability relative to aggregate earnings, and above all that disaggregating accruals into its major components further significantly increases the predictive ability. At the same time, Stammerjohan and Nassiripour (2001) studied the evidence resulting from the paper of Barth et al. (2001) and obtained findings consistent with their results. However, their studies do not statistically prove which component of the model has better predictive power than models based only on prior cash flows.

Evidence from Barth et al. (2001) is also confirmed and extended by Barth et al. (2002) who found that current and past earnings explain more variations in future

cash flows than the current and past cash flow themselves, but only after permitting the cash and accrual components of earnings have different multiples. Moreover, Barth and Hutton (2004) highlight that accrual and forecast revision strategies generate returns of 15.5% and 5.5% when implemented independently, but also that a combined strategy that uses forecast revisions to refine the accrual strategy generates a return of 28.5%. This means that accruals can be used to refine the forecast revision strategy³⁷.

Among the studies which had such similar results, Kim and Kross (2005) invigorate the trend investigating the relationship between earnings and one-year-ahead operating cash flows and stating that – although the extant research to that date indicates a weakening relationship between contemporaneous earnings and stock prices over time³⁸ – the relationship between current earnings and future operating cash flows has increased over time.

Yoder (2006), instead, extends the model of the accrual process developed by Barth et al. (2001) by including cash flow implications of growth in future sales, and also presents an accrual-based cash flow prediction model based on a random walk in cash flows adjusted for the reversal of current payables and receivables. Consistent with accruals incorporating predictions of future sales, Yoder (2006) finds that the accrual-based model is superior to the cash flow-based model in capturing the effect of future sales on future cash flows.

³⁷ However, Barth and Hutton (2004) indicate that, although forecast revisions reflect information about accruals and earnings persistence beyond that reflected in the level of current year accruals, investors do not fully incorporate this information into their valuation assessments.

³⁸ See, for example, Ryan and Zarowin (2003), Brown et al. (1999), Ely and Waymire (1999) Francis and Schipper (1999), Lev and Zarowin (1999), Collins et al. (1997).

Hollister et al. (2011) provide a more comprehensive analysis comparing, for nine countries³⁹, the extent to which information provided by accruals, under accounting systems with different characteristics, improves the ability to predict future operating cash flows, particularly next period's operating cash flows. Their findings highlight that the components of accrual accounting earnings provide incremental information relative to current cash flows from operations in explaining next year's cash flows from operations. Moreover, they demonstrate that accruals generated by shorter horizon in code-law regimes provide more incremental explanatory power for short-term predictions than those of longer horizon in common law countries.

El-Sayed Ebaid (2011) also examines the comparative abilities of current period cash flows and earnings (and its components) to predict one-year-ahead cash flow from operations, but in Egypt. The study uses the cash flow prediction models developed by Barth et al. (2001) and reveals that aggregate earnings have superior predictive ability than cash flows for future cash flows. Moreover, results highlight that disaggregating accruals into major components – changes in accounts receivables and payables, and in inventory, depreciation, amortization, and other accruals – significantly enhances predictive ability of earnings.

Jordan and Waldron (2011) followed the line and evaluated the ability of accrual based measures versus cash based measures in predicting future cash flows. Evidence from regression analysis indicated that each model provided significant predictive power in forecasting future cash flows. However, both coefficients of

³⁹ Four of these countries are classified as having common-law legal systems: Australia, Canada, the United Kingdom, and the United States. The remaining five countries have code-law systems: France, Germany, Japan, the Netherlands, and Switzerland.

determination and percentage prediction errors suggested that earnings model produced more predictive power than other models.

The alleged predictive power of earning and accruals over cash flows measure is also supported by Mottaghi (2011), even if he provides a weak evidence. Specifically, he analyzes the predictive ability of current and past cash flows with respect to the estimation of future cash flow, and compares this predictive ability with that of current and past earnings. Moreover, he investigates whether the disaggregation of earnings into cash flow, accruals and their components adds power to the predictive ability of cash flow, using a UK based sample. His results indicate that, whilst there is no notable difference between the ability of cash flow and aggregate earnings to predict future cash flow, the disaggregation of earnings into cash flow and accruals improves the prediction. However, when using information in the Balance Sheet, the results of both the in-sample estimation and the out-of-sample accuracy tests show that disaggregated earnings is unable to outperform aggregate earnings in predicting future cash flow. Nevertheless, when total accruals are further disaggregated, the in-sample estimation reveals additional improvement in predictive ability, although this is less evident with the out-of-sample tests.

Arnedo et al. (2012), instead, focused on Spanish companies to determine whether accruals have information value beyond that provided by isolated current cash flows for the prediction of future cash flows. Their findings reveal that the out-of-sample prediction errors provided by the accrual-based earnings model are significantly lower than those obtained with the cash flows model, and that the predictive ability increases if accruals are involved in a more disaggregated

fashion. This means that their results are consistent with the argument that accruals add relevant information for the prediction of future cash flows.

On the same wavelength there is also another local study of Takhtaei and Karimi (2013) who examined companies in Tehran Stock Exchange and find that net earnings have more ability than operational cash flows and its traditional proxies in predicting the cash flows future.

Finally, Barth et al. (2016) set up a model adapting Feltham and Ohlson (1995) and Ohlson (1995) and extending Dechow and Dichev (2002), in order to characterize the information about future cash flows reflected in accruals. Specifically, the question they address is related to what accounting accruals tell us about a firm's future cash flows and thus how they help in forecasting the firm's future cash flows and earnings and thereby in valuing the firm's equity. Findings from their model reveal that accruals are able to provide useful information about next period's economic factor and the transitory part of one component of next period's cash flow, especially partitioning them based on their role in cash flow alignment⁴⁰.

2.1.2 Pro-cash

On the other hand, following Bowen et al. (1986), Percy and Stokes (1992) extended their study by analyzing the relationship between cash flows and earnings across industries using Australian data. Their findings confirmed Bowen et al. (1986) in that the traditional cash flow measure enhance the predictive

⁴⁰ The extent to which each accrual provides this information depends on whether the accrual aligns future or past cash flows and current period economics and whether it relates to the current or prior period.

ability than do either earnings or more refined cash flow measures, but it should be noticed that such predictive abilities were different across industries.

Another important study is the one of Finger (1994) who examines the value relevance of earnings by testing their ability to predict earnings and cash flow from operations. His findings show that, in-sample, earnings are a significant predictor of themselves and that, out-of-sample, random walk models outperform individually estimated earnings models for one-year but not for four- or eight-year horizons. Moreover, tests on the ability of earnings to predict future cash flows from operations show that earnings, used alone and together with cash flow, are a significant predictor of future cash flows. Finally, he compares the ability of earnings and cash flow to predict future cash flows and highlights that the latter is a superior predictor for short term while both data are approximately equivalent for longer horizons, partially confirming the results of Bowen et al. (1986).

Using a larger sample, Burgstahler et al. (1998) also find that cash flow has more predictive ability than aggregate earnings, as Quirin et al. (1999) that re-examined the relative ability of earnings and cash flow measures to predict one-year ahead operating cash flows using actual cash flow data from the cash flow statement for an eight-year period. Specifically, they concluded that accrual based earnings provide a lower predictive ability than cash flow based predictors. Such evidence is then confirmed by Quirin et al. (2000) who replicated Bowen et al. (1986), focusing on the oil and gas industry and obtaining similar results.

In the case of Asian countries, Supriyadi (1998) analyzes the ability of accounting information to predict future cash flows of Indonesian firms. The study shows that cash flow model outperformed the earnings model and the model containing both

earnings and cash flows. Results also showed that adding current accruals and revenues into the prediction model did not significantly provide more predictive power than only cash flows.

In more recent years, Seng (2006) tried to shed lights on the ability of earnings and reported cash flows – rather than estimated cash flows used in some previous researches⁴¹ – to forecast one- and two-period ahead cash flows, using predictive models based on research methodology applied by Bowen et al. (1986) and focusing on New Zealand. In particular, results show that reported cash flow measures appear to be better predictors of themselves than earnings.

In addition to the aforementioned ones, two other studies confirm the supremacy of cash flow from operations versus accrual accounting figures in forecasting future cash flow from operations. Specifically, Mooi (2007) address such an issue using multivariate regression models and panel data on a sample of firms listed on Bursa Malaysia and provide evidence that cash flow from operations data do have incremental predictive ability over accrual measures. In addition to Mooi (2007), Zhao et al. (2007) examined the question in the Australian context and their evidence also indicates that current cash flow from operations has a superior predictive ability and an incremental information content over current earnings in the prediction of future cash flow from operations. The Australian settings were also analyzed by Farshadfar et al. (2008) who confirmed that cash flow from operations has more power in predicting future cash flows than earnings and traditional cash flow measures.

⁴¹ Austin and Bradbury (1995) examine the accuracy of mechanical procedures used to estimate cash flows by measuring errors between estimated and reported cash flows. Their results show that mechanical rules provide poor estimates for reported cash flows. Therefore, by using reported cash flows the current study will provide further evidence on the predictability of future cash flows.

The strand continues with Loker and Willinger (2009) who investigate the ability of past operating cash flows and past earnings to generate predictions of operating cash flows. They derive out of sample predictions of operating cash flows both cross-sectionally – similar to the approach of Kim and Kross (2005) – and on a firm-specific time-series basis consistent with Dechow et al. (1998), and suggest that cash-flow based models provide significantly more accurate predictions of operating cash flows than earnings-based models.

Similar results are also obtained by Dawar (2015), who utilizes the cash flow prediction models to examine the relative predictive abilities of current earnings (and its components) and cash flows for next period cash flows in case of Shariah-compliant companies in India. In particular, he shows that current cash flows have superior predictive ability of next period cash flows than current aggregate earnings and that there are no gains from decomposing earnings into accruals and cash flows in predicting future cash flows.

2.1.3 Mixed results

Besides these studies that can be clearly classified in supporting the predictive ability of earning and accruals, or cash flows, there are some other studies that fail in the attempt to obtain a definitive result. In particular, the Singaporean study by Austin and Andrew (1989), whose approach was similar to that of Greenberg et al. (1986), found that neither earnings nor cash flow from operations proved to be superior in predicting future cash flow from operations. In addition, McBeth (1993) examines the ability of cash flows and earnings to predict future cash flows by using cash flow from operations directly from the statement of cash flow and net income from the income statement. However, he suggests that neither net

income nor cash flows from operations prevail as a better predictor of future cash flows. Apellániz (1995), instead, in an attempt to analyze which accounting number between cash flow measures and accruals could be the most useful for the Spain financial information users, found that the differences in the predictive ability between those figures were not statistically significant, indicating that their aptitude is similar. Jordan and Waldron (2011), on their own, simply reveal that one variable consistently achieves superior results in predicting operating cash flows: net earnings plus depreciation and amortization. In particular, it represents an easily computed surrogate measure of cash flows that still maintains a strong base in accrual earnings, so the best predictor of future operating cash flows seems not to be a pure measure of either accrual earnings or cash flows, but rather a hybrid measure containing elements of both. Finally, Farshadfar and Monem (2013) investigate whether accrual and cash flow components of earnings improve the predictive ability of earnings for forecasting future cash flows, exploiting data from Australia where reporting of actual cash flow components had been mandatory since 1992. As other studies, they are not able to label one of the measures as a better predictor of future cash flows, since they show that accrual components and operating cash flow components together are more useful than both earnings and aggregate cash flows and total accruals, and even of aggregate cash flows and disaggregated accrual components.

2.1.4 Summary on the predictive ability of accounting numbers

Overall, previous research related to the association between current accounting numbers, and future cash flows and earnings highlights that cash flows, earnings and accruals have a role in predicting future cash flows and earnings, however the

results are widely mixed and still unclear. Therefore it is not possible to conclude whether cash flows, earnings or accruals provide a better prediction power. Except for some rare cases⁴², the only evidence that clearly stands out is that decomposing earnings in its components and further decomposing these components in their fundamentals, can improve the predictive ability of accounting numbers and, consequently, their usefulness.

2.2 Value relevance of accounting numbers

The another important research stream, related to the assessment of the usefulness of accruals and earnings relative to cash flows, relies on the value relevance of the formers through their association with concurrent and future stock prices and returns⁴³.

One of the basic assumption in this field, as pointed out by Ball and Brown (1968), relies on an impressive body of theories which support the proposition according to which capital markets are both efficient and unbiased. As a result, if an information is useful in determining capital asset prices and returns, then the market will quickly adjust valuations and expectations relying on the new available information, leaving no room for any further abnormal gain⁴⁴.

⁴² See, for example, Farshadfar and Monem (2013), and Dawar (2015).

⁴³ According to Beaver and Dukes (1972), considerable theoretical and empirical support exists for expecting an association between earnings and security prices. In fact, the earnings power of the firm plays a central role in virtually all valuation theories, including such diverse models as those of Graham et al. (1962), and of Miller and Modigliani (1966). Empirical evidence has also been provided by cross sectional studies that predict the value of firms (or the firm's securities) as a function of earnings. For example, Miller and Modigliani (1966) stated that the earnings term is the most important explanatory variable in the prediction equation.

⁴⁴ For example, Samuelson (1965) demonstrated that a market without bias in its evaluation of information will give rise to randomly fluctuating time series of prices. See also Cootner (1964), Fama (1965), Fama and Blume (1966), Jensen (1969), and Fama et al. (1969).

The seminal work on the value relevance of accounting data is Ball and Brown (1968). Specifically, they assume that in the unlikely absence of useful information about a particular firm over a period, its rate of return over the same period would reflect only the presence of market-wide information which pertains to all firms. However, their results highlight that the information embedded in the income number are useful, since they are related to stock prices, and that residual cash flow changes were less successful than residual earnings changes in predicting the sign of residual price changes.

Following Ball and Brown (1968), Beaver and Dukes (1972) also present some preliminary findings regarding the association between security prices and alternative income numbers, focusing on the issue of inter-period tax allocation⁴⁵. Relying on the alternative accounting measures implied, they found that residual changes in security prices were more highly associated with residual changes in earnings than with residual changes in cash flow. Specifically, deferral earnings has the highest association, earnings without deferral is next, with cash flow performing most poorly⁴⁶.

⁴⁵ For a comprehensive review of the inter-period tax issue, in that period, please refer to Black (1966). Moreover, according to Beaver and Dukes (1972), another interesting paper is by Greenball (1969). Specifically, findings from this study are important in at least two respects:

(1) The findings illustrate dramatically that it is dangerous to argue about the relative merits of one set of measurement alternatives (e.g., tax deferral) and at the same time ignore other sources of measurement error in earnings. This is especially important here because the tax deferral controversy is inherently related to the measurement of depreciation. Hence errors induced by depreciation measurement may largely determine whether or not tax deferral should be adopted. The presence of correlated measurement errors makes any sort of isolated analysis suspect.

(2) No statements can be made about the tax deferral without making an assumption about the nature of cash flow patterns that occur empirically. Hence, it is impossible to make unconditional generalizations about the relative efficacy of deferral or non-deferral.

⁴⁶ Related to the specific topic of the paper, a finer interpretation of the findings, according to the authors, is that deferral earnings, when used in the context of the prediction model tested, are more consistent with the underlying information set used in setting equilibrium security prices than the other measures tested.

It can be noticed that both studies (Ball and Brown, 1968; Beaver and Dukes, 1972) found that security price changes appear to be more highly associated with earnings changes than with cash flow changes, providing some indirect evidence consistent with the idea according to which current earnings are a better measure of performance than cash flows. However, both studies used simple cash flow surrogates instead of cash flow from operations, and neither study attempted to add tests in order to analyze the incremental information content of earnings and cash flows.

Therefore, Patell and Kaplan (1977) investigated the marginal information content of cash flows beyond that of annual earnings. In particular, they define abnormal returns through the market model and consider the incremental information content of funds, after controlling for earnings and so implementing a procedure similar to that used by Gonedes (1975, 1978). They found no statistically significant security price movement related to cash flows, after conditioning on the information content of earnings. As a result, their evidence is aligned to previous findings, even if they could not reject the hypothesis that no additional information content exists.

The first studies that differs from the previous, in terms of results, are by Lawson (1981) and Beaver et al. (1982). The former examined operating cash flows and accrual earnings in the U.K. manufacturing sector and showed that cash flows are relevant for stock market valuation, while accrual earnings are not as relevant as cash flows for the market valuation purposes, even though earnings are of great importance to management and lenders. Beaver et al. (1982), instead, perform a cross-sectional regression analysis with raw returns as dependent variable and

cash flow – defined as in Beaver and Dukes (1972) – and earnings as independent variables. In a pooled regression of observations, given that the coefficient of the cash flow variable is significant, they conclude that cash flow adds explanatory power to the earnings variable.

A more detailed study is proposed by Hamon (1984), who examines the relative importance of earnings versus funds flows, evaluating the association between market reaction and three measures of income against the association between the former and six measures of funds flows⁴⁷. Although results were not so consistent over years, the general evidence shows that, as a group, earnings variables were more associated with market reaction than were funds flow variables.

Except for Lawson (1981) and Beaver et al. (1982), the aforementioned studies, related to relative association of operating cash flows and accounting earnings with stock prices and returns, highlight the prominent role of earnings. However, it should be noted that any information that earnings provide about operating activities that is incremental to the information provided by cash flows is a function of the accrual adjustment process which transforms cash flows into earnings. Therefore, the usefulness and reliability of accruals in a valuation context started to be challenged by academics and members of the financial community. In fact, according to Rayburn (1986), if accruals have no association with security returns, given the association of returns with cash flow, then it could be questioned whether the accrual adjustment process significantly should

⁴⁷ While cash flow refers to the inflows and outflows of cash generated by a business during a reporting period and can be clustered in operating, investing and financing, funds flow is primarily related to changes in an entity's net working capital position between two subsequent accounting periods and can be obtained, for examples, starting from the earnings plus adjustments for components of earnings not affecting working capital.

enhance investors' ability to assess the future cash flows of a business organization. Consequently, Rayburn (1986) examined the association of operating cash flow and accruals with security returns and showed that both operating cash flow and aggregate accruals were associated with abnormal returns. Moreover, using a single-return two-events model with a 12-month event interval, he demonstrates that new information about accruals have incremental information content beyond new information about cash flow.

This aspect is also deepened by Wilson (1986, 1987). Specifically, his studies addressed the question of whether the accrual and funds components of earnings have incremental information content beyond earnings itself and highlighted that total accruals and cash from operations, taken together, have incremental information content beyond earnings, with a positive association between these components and stock returns. Moreover, Wilson (1986) also shows that the total accruals component of earnings has incremental information content beyond the cash component⁴⁸.

In the same way Bowen et al. (1987) studied the role of accrual and cash flow measures in an explanatory model of security prices testing for both the association between market returns and cash flows, after controlling for the relation between returns and earnings, and for the association between security returns and earnings, after controlling for the relation between returns and cash flows. However, they obtained mixed results because they find that cash flow data had incremental information content relative to that contained in both earnings

⁴⁸ Wilson (1986) also considers separately the relative information content of non-current accruals and working capital from operations and suggests that either non-current accruals do not have incremental information content beyond working capital from operations or that they are known prior to the earnings announcement.

and working capital accruals, but also that accrual data, jointly and separately, had incremental information content in addition to that contained in cash flow data. Moreover, their results do not support the hypothesis according to which accruals have incremental information content relative to that contained in earnings.

Since the increasing attention on this kind of studies, Bernard and Stober (1989) examined some elements of previous researches. However, they were unsuccessful in explaining stock price behavior around the release of detailed financial statements and they conclude that either the security price reactions to the release of cash flow and accrual data in financial statements are too highly contextual to be parsimoniously modeled, or important uncertainties about the contents of detailed financial statements are resolved prior to their public release. Moreover, given the failure to confirm the relations observed in previous studies, Bernard and Stober (1989) analyzed progressively more contextual models of the implications of cash flows and accruals. Nevertheless, they were unable to identify the economic logic underlying how the market assimilates information about cash flows and accruals, and they conclude that there are no systematic differences between the implications of cash flows and accruals, as reflected in stock price behavior surrounding the release of detailed financial statements.

The research stream keeps on with the last study of the eighties. Specifically, Board and Day (1989) investigates the link between earnings and share prices for a sample of UK companies from 1961 to 1977, after controlling for the level of inflation. In particular, their findings indicate that, while there is substantial information content in the traditional historical cost rate of return, there is very

little information conveyed by the measure closest to pure cash flow. Therefore, they conclude that no support was found for the use of cash flow based reports.

Although the prevailing idea among previous researches seems to tow the hypothesis according to which earnings and accruals better reflect the trend in stock prices and returns, the debate remained intense. In fact, according to Jennings (1990) the most common analysis in studies of incremental information content is to examine the coefficients from a regression of market-adjusted security returns for a 12-month period on the unexpected portion of two or more accounting income variables. A nonzero coefficient on one accounting variable is interpreted as evidence that the variable has information content that is 'incremental' to the other variables in the equation. However, he notices that the accounting interpretation of this result in terms of the composition or disclosure of income depends on the other independent (conditioning) variables included in the estimated relation. Therefore, the interpretation of results beyond a statistical statement that one variable has information content incremental to another depends on the specification of the regression equation that is estimated. For these reasons, Jennings (1990) reviewed and extended Rayburn (1986) and Bowen et al. (1987) from the perspective of the composition and disclosure of income. Taken together, the additional tests based on data reported in such studies provide consistent and strong evidence that both cash flow and accrual components of earnings add value to the informativeness of income. However, he shows that there is only weak and inconsistent evidence that accrual components of income are valued differently from cash flow components by investors and, therefore, suggests that more research is needed on this issue.

A different facet is analyzed by Charitou and Ketz (1990), who proposed a cross-sectional equity valuation model in order to examine the incremental valuation content of earnings and cash flows in the marketplace. Specifically, they noted that when earnings is in the model, no other asset flow measures have a valuation content and that when cash flow is in the model, the various accruals do have valuation content. Thus, as Wilson (1986) and Rayburn (1986), they suggest that cash flow is not enough and that other components of earnings have incremental valuation content.

Unlike the majority of previous studies, Livnat and Zarowin (1990) indicate that disaggregation of net income into cash from operations and accruals does not contribute significantly to the association with security returns beyond the contribution of net income alone. However, further disaggregation of financing and operating cash flows into their components significantly improves the degree of association, while there is no evidence of differential associations across components of investing cash flows.

Moving away from the Anglo-Saxon context, Kinnunen and Niskanen (1993) examines whether observed market reactions to unexpected cash flows are sensitive to the random walk assumption of cash flow behavior, using a sample from the Helsinki Stock Exchange. Since their evidence shows that market reactions to unexpected cash flows of Finnish firms are insignificant when expected cash flows are measured with the random walk (with drift) model, but they are significant when cash flow expectations are measured with parsimonious non-random walk models, they conclude that cash flows have incremental information content beyond that of earnings. Moreover, they suggest that prior

studies which rely on the random walk assumption have probably been biased against finding a significant market reaction to cash flow information.

A new approach in this research stream were also proposed by Ali (1994), who extend prior research by allowing for non-linear relations between returns and each of the three performance variables: earnings, working capital from operations, and cash flow⁴⁹. His results support the non-linear relation between returns and all performance variables, and suggest that a non-linear relation may be found between returns and other non-earnings data as well⁵⁰.

Dechow (1994), instead, is probably the milestone of the recent years. In this paper, stock prices are viewed as encompassing the information in realized cash flows and earnings concerning firm performance, and are used in the empirical tests as the benchmark against which to compare the two performance measures. Specifically, these tests do not directly address the question of which measure is a relatively superior summary measure of firm performance given the choice of one, but cash flows and earnings are set up as competing performance measures to

⁴⁹ Freeman and Tse (1992) document a non-linear relation between abnormal returns and unexpected earnings. Specifically, they argue that as the absolute value of unexpected earnings increases, the 'persistence' of earnings declines and so does the marginal price response to unexpected earnings. They also note that the slope coefficient on unexpected earnings from a linear model would predominantly reflect the effects of transitory, rather than permanent, earnings (because a linear model heavily weights the coefficient on high-magnitude transitory earnings). Therefore, Ali (1994) states that if other performance measures (specifically, unexpected accruals and unexpected cash flows) also have high concentrations of transitory components in high-magnitude observations, regression coefficients from the multivariate linear models in prior studies would also be biased toward zero. Thus, previous research may have failed to reject the null hypotheses of no incremental information content of accruals and cash flows when, in fact, these null hypotheses are false.

⁵⁰ When he carries on additional tests, implementing linear model as in prior studies, results are not consistent with cash flow shaving incremental information content beyond earnings and accruals.

explain stock returns⁵¹. Her findings show that over each measurement interval, earnings are more strongly associated with stock returns than either cash flow measure⁵².

Then, Ali and Pope (1995) re-examine the incremental information content of earnings, funds flow, and cash flow by incorporating some innovations in the specifications of earnings-returns models for the purposes of assessing incremental information content⁵³. Their evidence suggests that the three performance measures have an individually explanatory power for returns and that, by adopting these innovations, the explanatory power of both the funds flow-returns model and the cash flow-returns model improve significantly compared to previous model specifications. Therefore, Ali and Pope (1995) support the thesis

⁵¹ Market-wide returns are deducted from stock returns because they have low associations with realized cash flows and earnings, so this improves the power of the empirical tests (Sloan, 1993). Similar results are obtained when raw stock returns are substituted as the dependent variable. The performance measure (either realized cash flows or earnings) that has a higher association (R^2) with stock returns is then interpreted as more effectively summarizing firm performance.

⁵² Findings are also consistent with Easton et al. (1992), who show that earnings' association with stock returns improves over longer measurement intervals. In addition, the ability of realized cash flows to measure firm performance improves relative to earnings as the measurement interval is lengthened. Moreover, earnings have a higher association with stock returns than do realized cash flows in firms experiencing large changes in their working capital requirements and their investment and financing activities. In fact, under these conditions, realized cash flows have more severe timing and matching problems and are less able to reflect firm performance. Dechow (1994) also predicts that although accruals improve earnings' association with stock returns, certain accruals are less likely to mitigate timing and matching problems in realized cash flows. Evidence is presented indicating that long-term operating accruals play a less important role in this respect. In addition, the inclusion of special items in earnings is shown to reduce earnings' association with stock returns over short intervals.

⁵³ Some studies showed that the explanatory power of the earnings-returns models can be significantly improved in different way. Easton and Harris (1991) recommended the use of the current level of earnings together with the change in earnings (both deflated by the beginning of the period market value of equity) as complementary proxies for the unexpected component of earnings, instead of using just the change variable. Freeman and Tse (1992) suggested the implementation of a specific non-linear form for the relation between returns and earnings instead of a linear relation. Strong and Walker (1993) promotes time-varying parameters in the earnings-returns model instead of constraining the parameters to be constant across years.

according to which funds flow have value-relevant incremental information beyond earnings and provide some empirical support for the presentation of funds flow statements.

These results are also confirmed by Cheng et al. (1996) that assess the incremental power of cash flows from operations and earnings in explaining stock returns when earnings are transitory⁵⁴. In particular, their analysis suggests that the incremental information content of accounting earnings decreases, and the incremental information content of cash flows from operations increases, with a decrease in the permanence of earnings.

Two other fundamental studies are from Cotter (1996) and Sloan (1996). The former implements the empirical framework developed by Easton et al. (1992)⁵⁵ to examine the relative ability of the accruals and cash flow accounting models to capture value relevant events. As expected, looking at the theories on the reducing noise role of accruals, results indicate that the association between stock returns and earnings is higher than that with total cash flows for return intervals of between one and ten years. Sloan (1996), instead, deserves credit for the emphasis of the ‘fixation theory’. Specifically, by analyzing the nature of the information contained in the accrual and cash flow components of earnings and the extent to which this information is reflected in stock prices, he highlights that earnings performance attributable to the accrual component exhibits lower

⁵⁴ Specifically, they measure transitory items using earnings change scaled by beginning-of-period price (Ali, 1994) and the earnings-to-price ratio (Ou and Penman, 1989; Ali and Zarowin, 1992).

⁵⁵ Easton et al. (1992) outline the limitations of the accounting earnings measure in terms of an asynchronization of the recognition of value relevant events between the occurrence of the event and its recognition in earnings. Specifically, they stated that not all value relevant events observed by the market will be recognized as part of earnings during the return period, and conversely, earnings include the effects of events observed by the market prior to the return period.

persistence than earnings performance attributable to the cash flow component. However, he also indicate that stock prices act as if investors ‘fixate’ on earnings, failing to fully distinguish between the different properties of the accrual and cash flow components of earnings⁵⁶.

Charitou (1997) extends the growing empirical literature on the association of earnings and cash flows with security returns and provides evidence that cash flows have information content beyond earnings. Moreover, his results also indicate that cash flows play a more important role in the marketplace the smaller the absolute magnitude of accruals, the longer the measurement interval and the shorter the firm’s operating cycle.

Ingram and Lee (1997), on their own, by addressing the information provided jointly by income and operating cash flow, simply reveals that the information content of such accounting measures is dependent on their relative magnitudes.

Pfeiffer et al. (1998), following Ali (1994), document that proxies for market expectations of the components that are based on measures of historical serial- and cross-dependencies are substantially more accurate than random-walk proxies. Moreover, they detect significantly higher valuations of the operating cash flow component of earnings, relative to current accruals, when market

⁵⁶ A number of studies presented evidence that investors do not correctly use available information in forecasting future earnings performance (Ou and Penman, 1989; Bernard and Thomas, 1990; Hand, 1990; Maines and Hand, 1996). Therefore, according to Sloan (1996), this evidence raises the possibility that the well documented association between earnings and stock returns may, in part, reflect investors’ naïve fixation on reported earnings, rather than earnings’ ability to summarize value relevant information. Moreover, this naïve earnings expectation model is consistent with the functional fixation hypothesis, which has received empirical support in capital markets, behavioral, and experimental research (Hand, 1990; Abdel-khalik and Keller, 1979; Bloomfield and Libby, 1995).

expectations are represented using the dependency-based predictions, while such differential valuation is not detectable for random-walk representations.

Unlike prior studies, Shroff (1998) illustrates some inherent benefits of accrual accounting, by examining the smoothing and aggregation properties of accrual income and showing how these properties relate accrual income to cash flows and market returns, through a practical exercise with students. The experiment helps demonstrate that accrual income has lower variance, higher correlation with returns and higher predictive ability for returns than cash flow from operations, even if, over long time periods, aggregate accrual income, cash flow and returns capture the same total information. In the same year, a different approach was also proposed by Wang and Eichenseher (1998) who examined the relationship between the informativeness and the predictability of cash flow data using a two-signal capital asset pricing model. Their study predicts that the incremental informativeness of cash flows is an increasing function of its predictability and a decreasing function of the predictability of earnings. In addition, their evidence indicates that cash flow data are particularly incrementally informative when the predictability of earnings is low. Finally, findings suggest that when the predictability of earnings is high, cash flow data contribute little incremental information even if the predictability of cash flows is high.

Barth et al. (1999) in an attempt to provide insights into the characteristics of the accrual and cash flow components of earnings that affect their relation to firm value⁵⁷, obtained mixed and conditional results. In fact, they find that both

⁵⁷ Barth et al. (1999) achieve their objective through the framework in Ohlson (1999), which extends Ohlson (1995) by modeling earnings components. The modeling extension suggests that the value relevance of an earnings components depends on its ability to predict future earnings incremental to earnings itself and on the persistence of the component.

accruals and cash flows come in with their own incremental explanatory power, and suggest that the interaction between the characteristics of earnings components, their ability to aid in forecasting future earnings, and the persistence of the components themselves, results in different valuation implications for accruals and cash flows.

Charitou and Clubb (1999), tried to provide a fuller understanding of the process linking security returns, cash flows and earnings by focusing on the effect of long return intervals on the association between security returns and earnings and cash flow variables, relying on UK data. In general, their empirical findings indicate that multivariate cash flow analysis over long return intervals results in higher explanatory power for returns than a univariate approach and that large increases in explanatory power can arise by adding cash flow numbers to accounting earnings as explanatory variables for long interval security returns. Therefore, they conclude that these results represent strong evidence of the valuation relevance of cash flow information over accrual and earning.

Similar results are obtained by Pfeiffer and Elgers (1999), who reevaluates the securities market's differential pricing of the operating cash flow, current accrual (non-cash working capital), and non-current accrual components of earnings. Specifically, they find no statistically significant differential valuations of operating cash flows and current accruals in the conventional model that relates current security returns to changes in these earnings components. However, when they allow for the market's multiyear correction of past mispricing and mean reversion in the earnings components, they show significant valuation differences for operating cash flows, relative to both current and noncurrent accruals.

Plenborg (1999), instead, tried to reach the point by examining the information content of Danish earnings and cash flows. In particular, he suggests that, while earnings are relatively more informative than various cash flow measures, the aggregated effect of cash flows has incremental information content beyond earnings even over longer return intervals.

Following the sub-stream launched by Sloan (1996), Ali et al. (2000) explore whether the association between accruals and future returns is really due to the naïve investors fixation on the total amount of reported earnings without regard on the relative magnitude of the accrual and cash flow components. However, contrary to the predictions of the naïve investor hypothesis, they find that the predictive ability of accruals for the next year returns and quarterly earnings stock returns is not lower for large firms or for firms followed more by analysts or held more by institutions⁵⁸. Further, they also find that the ability of accruals to predict future returns does not seem to depend on stock price or transaction volume. Therefore, they conclude that the predictive ability of accruals for subsequent returns does not seem to be due to the inability of market participants to understand value-relevant information, and that accrual effect is not consistent with earnings fixation by naïve investors⁵⁹.

⁵⁸ Bernard and Thomas (1989, 1990) and Bhushan (1994) show that the post-earnings announcement drift is inversely related to firm size, and that the inability to document such inverse relation further suggests that the accrual effect documented in Sloan (1996) is not caused by earnings fixation by naïve investors. Bhushan (1994) also shows that post-earnings announcement drift is inversely related to transaction costs, consistent with a naïve investor hypothesis. However, Ali et al. (2000) find that the negative association between the accrual portion of earnings and next year returns is significantly greater for firms with low transaction costs.

⁵⁹ Diametrically opposed results were achieved by Barone and Magilke (2009), who examine the role of sophisticated investors in the pricing of both accruals and cash flows, and find evidence consistent with predictions of the naïve-investor hypothesis.

Bartov et al. (2001), instead, tried to deeply investigate which variable (earnings or cash flows) provides greater information for equity valuation, by analyzing various countries with different settings⁶⁰. Generally, they find that earnings from the three Anglo-Saxon countries have greater explanatory power for stock returns than cash flow metrics, while in two non-Anglo-Saxon countries earnings are generally not better than to cash flows, except in Japan. However, in all countries earnings have incremental information content over cash flows in explaining returns. Therefore, Bartov et al. (2001) generalize the findings of prior U.S. research by stating that earnings are more important than cash flows for equity valuation in other Anglo-Saxon countries, but they also suggest that the superiority of earnings over cash flows could not be universal.

On the same wavelength there are Haw et al. (2001), who investigate the relative and incremental information content of earnings, operating cash flows, and accruals in the Chinese market, and find that earnings has incremental information content over operating cash flows, but not vice versa. Moreover, their results also demonstrate that accruals contribute to the value-relevance of earnings.

Callen and Segal (2004), instead, address the relative value relevance of accrual news, cash flow news, and expected return news in driving firm-level equity returns, and show that operating income news are also found to significantly dominate both expected-return news and free cash flow news in driving firm-level stock returns. Moreover, after splitting net income into cash flow and accrual

⁶⁰ Such countries are: the United States, the United Kingdom, Canada, Germany, and Japan.

earnings components⁶¹, they conclude that accrual news are found to significantly dominate expected-return news in driving firm-level stock returns.

Following the idea related to the analysis of disaggregated accounting numbers, Barth et al. (2005) uses out-of-sample equity value estimates to determine whether earnings disaggregation, imposing valuation model linear information structure (LIM) and separating industry estimation of valuation model parameters, aids in predicting contemporaneous equity values. In particular, findings suggest that if concern is with errors in the tails of the equity value prediction error distribution, then earnings should be disaggregated into cash flow and the major accrual components (or at least total accruals). Moreover, they demonstrate that, imposing the LIM structure neither increases nor decreases prediction errors, which provides support to the efficacy of drawing inferences from valuation equations based on residual income models that do not impose the structure implied by the model. Finally, Barth et al. (2005) highlights that the valuation of abnormal earnings, accruals, accrual components, equity book value, and other information varies significantly across industries. Partially similar conclusions were reached by Shivakumar (2006), who showed that a strategy that decomposes earnings news into its components significantly outperforms strategies based on earnings news alone. Moreover, since some prior studies have shown that cash flows have significantly greater impact on stock prices than accruals, he examines the implications of these findings for the post-earnings announcement drift anomaly. Specifically, he argued that, if investors under-react to earnings news, then the

⁶¹ According to the authors, this paper extends the variance decomposition framework of Campbell (1991), Campbell and Ammer (1993), and Vuolteenaho (2002). Specifically, the extension is based on the Felthama-Ohlson (1995, 1996) clean surplus relations.

larger price impact of cash flows causes the cash flow component of earnings news to predict future returns better than the accruals component. Consistent with this view, he shows that unexpected cash flows are highly related to future returns, than are unexpected accruals, and that unexpected cash flows are found to predict future returns above and beyond that predicted by earnings surprises.

Subramanyam and Venkatachalam (2007) interestingly reexamine the relative role of earnings and operating cash flows in equity valuation, relying ex post intrinsic value of equity as the criterion for comparison. Specifically, they argue that the advantage of the ex post intrinsic value measure over stock returns is that it is not contaminated by the stock market's fixation on reported earnings (Sloan, 1996). Furthermore, unlike finite horizon future operating cash flows, ex post intrinsic values better reflect the magnitude, timing, and uncertainty of investors' future cash flows. Based on these assumptions, they find that accrual-based earnings dominate operating cash flows as a summary indicator of ex post intrinsic value.

Habib (2008), for its part, analyzed the relative and incremental information content of earnings and cash flows and the role of firm-specific contextual factors in moderating information content in New Zealand. However, he obtained weak results because his findings reveal that both earnings and cash flows have incremental information content for stock returns, and that earnings have higher explanatory power than cash flows, but the difference is not statistically significant. Finally, he showed that the valuation role of earnings and cash flows is moderated by firm-specific factors.

Linvat and López-Espinosa (2008), instead, focused on the full population of U.S. listed companies and specific industries, and using quarterly and rolling four-

quarter data, they explored the incremental roles of accruals and net operating cash flows in generating abnormal returns. In such settings, their results suggest that net operating cash flows are superior to accruals in their association with subsequent abnormal returns.

Hirshleifer et al. (2009) examine whether the firm-level accruals and cash flows affect aggregate stock market returns. However, in sharp contrast to previous firm-level findings, they find that aggregate accruals are a strong positive time series predictor of aggregate stock returns, while cash flow is a negative predictor.

Penman and Yhehuda (2009) analyze the classical idea according to which accrual accounting, rather than cash accounting, is appropriate for business reporting. The purpose of their paper is to investigate whether common shares are priced in the stock market according to accounting prescriptions on how earnings and cash flows affect shareholders' equity. Specifically, they find that, on average, annual changes in both the market value of firms and the market value of equity shares are positively related to annual earnings while, given earnings, changes in the market value of firms are negatively related to cash flows. Therefore, they conclude that not only accrual accounting promotes earnings as the primary valuation attribute (rather than cash flows), but actually treats cash flows as irrelevant to equity valuation.

Akbar et al. (2011) follow the sub-stream which investigates whether various partitions of earnings involving combinations of a cash flow measure of performance and measures of current accruals and non-current accruals improve the ability to explain market values relative to using earnings alone, by analyzing the UK context. Their results suggest strong support for the assertion according to

which cash flows can have incremental value relevance relative to either earnings. By implication, cash flows can have separate value relevance from total and, in particular, current accruals. There is slightly less consistent evidence that current and non-current accruals can have separate value relevance but, nonetheless, the results are still strongly in favour in this respect. Therefore, Akbar et al. (2011) conclude that the main source of increase in explanatory power for market values is the separate inclusion of cash flow measures in the estimated regressions.

Following Sloan (1996), Hollister and Shoaf (2011) employed the framework developed by Mishkin (1983) in order to test, in eight countries⁶², first whether stock returns are efficient with regard to the use of the persistence of total earnings and then to test whether they reflect the established properties of the accrual and cash flow components of earnings. However, their result are not so definitive, because they find that cash flows are significantly more persistent than accruals in all eight countries, but also that cash flows and accruals are each informative and incorporated in stock returns.

Nam et al. (2012) follow the classical stream and revisit the role of the cash and accrual components of accounting earnings in predicting future cash flows using out-of-sample predictions and market value of equity as a proxy for all future cash flows. They find that, on average, accruals improve upon current cash flow from operations in predicting future cash flows.

Finally, the latest study in this field relates to prior research that examines the relation between cash flows, accruals and the cross section of expected returns, and is proposed by Ball et al. (2016). In particular, they show that cash-based

⁶² Canada, France, Germany, Hong Kong, Japan, Malaysia, the U.K., and the U.S.

operating profitability outperforms measures of profitability that include accruals, and that the former subsumes accruals in predicting the cross section of average returns. Therefore, they suggest that an investor can increase a strategy's Sharpe Ratio more by adding just a cash-based operating profitability factor to the investment opportunity set than by adding both an accruals factor and a profitability factor that includes accruals.

2.2.1 Summary on the value relevance of accounting numbers

Overall, beside a slightly predominant trend before the nineties in which accruals and earnings seemed to be preferred, results from the research stream, which analyze the value relevance of the accruals and earnings relative to cash flows through their association with concurrent and future stock prices and returns, has been characterized as weak and inconsistent. However, as for the studies related to the predictive ability of accounting numbers, the only evidence that seems to be almost not disputed refers to the usefulness of the decomposition of accounting figures in their components and further decomposing these components in their fundamentals, in order to improve their value relevance.

2.3 Other issues on accounting numbers

Besides the two main research streams related to the usefulness of accounting numbers in predicting future cash flows and earnings, and their value relevance for capital market participants, some other aspects have been investigated as regards to the relative information content of accruals, earnings, and cash flows.

Gombola and Ketz (1983) used a factor analysis in order to investigate the classification patterns of financial ratios. In particular, they found that cash flow

ratios rely on separate and distinct accounting factors which are not involved in any other group of ratios, including profitability ones. Therefore, they concluded that there is a clear difference between profitability measures and cash-flow measures, and suggest that the latter may contain some information not found in profitability ratios. Similar results, are also presented by Thode et al. (1986), who provide some empirical evidence that cash flow is a distinct measure with respect to earnings and accruals, and therefore has a differential information content.

However, it has to be noted that, according to Greenberg et al. (1986), evidence from Gombola and Ketz (1983) and Thode et al. (1986) may have been biased by the use of a simplistic cash flow surrogate instead of cash flow from operations.

Another interesting sub-stream is related to the role of accounting numbers in predicting corporate failure, that still remains a contentious issue. Specifically, Sharma (2001), although the literature tends to report that cash flow information does not add value to accrual failure prediction models, highlights some problems with this issue, and suggests theoretical arguments justifying the relevance of cash flow information for predicting failure. This topic was, then, deepened by Sharma and Iselin (2003a), who investigates the decision usefulness of reported cash flow and accruals information in a behavioral field solvency assessment experiment. Specifically, they found that judgments based on cash flows information were more accurate than judgments based on accruals information, and that the difference in judgment accuracy was more pronounced for insolvent (failed) companies than for solvent (non-failed) companies. According to the authors, this evidence suggests that cash flows information are more decision useful for firms experiencing financial distress, and implies that such information have greater

decision usefulness than accrual information for assessing corporate solvency. These results are, then, *tout court* confirmed by Sharma and Iselin (2003b) who, still relying on behavioral field experiment, also showed that cash flow model had better prediction accuracy than the accrual model.

Finally, Wertheim and Robinson (2011) extend prior research on the information content of earnings and cash flow to the area of explaining changes in liquidity. In particular, the overall implication of their results is that both income before extraordinary items and working capital from operations have more explanatory power than cash flow from operations in explaining changes in liquidity.

2.4 Summary of the information content of accruals

Results from studies related to assessment of the usefulness of accruals and earnings relative to cash flows must be necessarily considered as weak and incoherent. In fact – except for some peculiar aspects such as the failure prediction or the solvency assessment – prior literature fails to find consistent evidence of higher information content embedded in accruals and earnings over cash flow measures, and vice versa.

As showed in Table 1, the research stream focused on predictive ability of accounting numbers provides mixed result with no particular trend, except for the preponderance of studies that analyzed ‘specific local contexts’ (which are different from the mainstream one: the U.S.A.), among those that find an higher predictive ability of cash flow numbers over accruals and earnings⁶³.

⁶³ Moreover, the majority of these ‘local’ studies are focused on Australia in which the reporting of cash flow components had been mandatory since 1992 (see Farshadfar and Monem, 2013).

Table 14 – Summary on the information content of accruals

PANEL A: Predictive ability of accounting numbers								
<i>Pro-Cash</i>			<i>Pro-Accruals</i>			<i>Mixed</i>		
Authors	Year	No-U.S.A.	Authors	Year	No-U.S.A.	Authors	Year	No-U.S.A.
Bowen et al.	1986		Greenberg et al.	1986		Brooks	1981	
Percy and Stokes	1992	Australia	Murdoch and Krause	1989		Austin and Andrew	1989	Singapore
Finger	1994		Murdoch and Krause	1990		McBeth	1993	
Burgstahler et al.	1998		Lorek and Willinger	1996		Apellániz	1995	Spain
Supriyadi	1998		Dechow et al.	1998		Jordan and Waldron	2011	
Quirin et al.	1999	Oil-Gas ind.	Barth et al.	2001		Farshadfar and Monem	2013	Australia
Quirin et al.	2000	Indonesia	Stammerjohan and Nassiripour	2001				
Seng	2006		Barth et al.	2002				
Mooi	2007	Malaysia	Barth and Hutton	2004				
Zhao et al.	2007	Australia	Kim and Kross	2005				
Farshadfar et al.	2008	Australia	Yoder	2006				
Loker and Willinger	2009		Hollister et al.	2008				
Dawar	2015	India	El-Sayed Ebaid	2011	Egypt			
			Jordan and Waldron	2011				
			Mottaghi	2011	UK			
			Armedo et al.	2012	Spain			
			Takhtaei and Karimi	2013	Iran			
			Barth et al.	2016				
PANEL B: Value relevance of accounting numbers								
<i>Pro-Cash</i>			<i>Pro-Accruals</i>			<i>Mixed</i>		
Authors	Year	No-U.S.A.	Authors	Year	No-U.S.A.	Authors	Year	No-U.S.A.
Lawson	1981	U.K.	Ball and Brown	1968		Bowen et al.	1987	
Beaver et al.	1982		Beaver and Dukes	1972		Bernard and Stober	1989	
Livnat and Zarowin	1990		Patell and Kaplan	1977		Jennings	1990	
Kinnunen and Niskanen	1993	Finland	Hamon	1984		Ali	1994	
Ali and Pope	1995		Reyburn	1986		Ingram and Lee	1997	
Cheng et al.	1996		Wilson	1986		Pfeiffer et al.	1998	
Charitou	1997		Wilson	1987		Barth et al.	1999	
Wang and Eichenseher	1998		Board and Day	1989	U.K.	Bartov et al.	2001	
Charitou and Clubb	1999	U.K.	Charitou and Ketz	1990		Barth et al.	2005	
Pfeiffer and Elgers	1999		Dechow	1994		Habib	2008	New Zealand
Plenborg	1999	Danemark	Cotter	1996		Hollister and Shoaf	2011	
Shivakumar	2006		Sloan	1996				
Linvat and López-Espinosa	2008		Shroff	1998				
Akbar et al.	2011	U.K.	Ali et al.	2000				
Ball et al.	2016		Haw et al.	2001	China			
			Callen and Segal	2004				
			Subramanyam and Venkatachalam	2007				
			Hirshleifer et al.	2009				
			Penman and Yehuda	2009				
			Nam et al.	2012				
PANEL C: Other issues								
Authors	Year	Topic	Findings					
Gombola and Ketz	1983	Classification patterns of financial ratios through a factor analysis.	There is a clear difference between profitability measures and cash-flow measures. Cash-flow ratios may contain some information not found in profitability ratios.					
Thode et al.	1986	Foundamentals of cash flow's and accruals' informarion conten.	Cash flow rely on separate and distinct accounting factors with respect to earnings and accruals, and has a differential information content.					
Sharma	2001	Failure prediction models.	Theoretical arguments justifying the relevance of cash flow information for predicting failure					
Sharma and Iselin (a)	2003	Decision usefulness of cash flow and accruals in a behavioral field solvency assessment experiment.	Cash flows are more decision useful for firms experiencing financial distress, and have greater decision usefulness than accrual information for assessing corporate solvency.					
Sharma and Iselin (b)	2003	Prediction accuracyof reported cash flow and accruals in a behavioral field solvency assessment experiment.	Cash flow model had better prediction accuracy than the accrual model.					
Wertheim and Robinson	2011	Information content of earnings and cash flow in explaining changes in company liquidity.	Both income before extraordinary items and working capital from operations have more explanatory power than cash flow from operations in explaining changes in liquidity.					

Another particular trend can be observed in relation to the sub-stream that analyze the value relevance and the informativeness of accounting numbers. In particular, it can be noted that there is a temporal trend in which before the 90's the overwhelming majority of the studies are in favour of accruals, while starting from the second half of the 90's, results begin to be extremely mixed.

The only evidence that seems to be not so much disputed, in the research streams related both to the predictive ability and to the value relevance of accounting numbers, refers to the usefulness of the decomposition of accounting figures in their components and further decomposing these components in their fundamentals, in order to improve the value relevance of financial reporting.

Probably, such results inconsistency could be due, at least in part, to two reasons. The first one is the vastness of analyzed settings in terms of industries, markets (with their intrinsic inefficiencies), geographic areas, and reference periods. The second cause, instead, could refer to the host of models implemented, in which so many variables and proxies have been used in order to assess similar aspects.

Consequently, since reality often lies somewhere in the middle, it does not seem surprising that, years later, Jordan and Waldron (2011) confirm the insight of Bowen et al. (1986) according to which the most useful accounting number seems not to be a pure measure of either accrual earnings or cash flows, but rather a hybrid measure containing elements of both⁶⁴.

⁶⁴ According to Bowen et al. (1986), net income plus depreciation and amortization and working capital from operations appear to be the best predictor of cash flow from operations. Similarly, Jordan and Waldron (2011) suggest that the variable that consistently achieves superior results is net earnings plus depreciation and amortization. Therefore, it should be noted that these studies talk about a surrogate measure of cash flows that still maintains a strong base in accrual earnings.

3. Inside the accrual model

As shown in previous paragraphs, there are extremely mixed opinions about the role of accruals and, above all, about the usefulness of accounting numbers obtained under the accrual accounting system. However, beside the reasons previously mentioned such as the huge heterogeneity of settings, variables and proxies analyzed, another primary issue concerns the ground rules of the accrual accounting system.

In particular, as widely discussed in Chapter I, matching expenses with revenues is one of the basic concepts underpinning accrual accounting and, even in the face of the numerous issues, it still has its own significance. However, it has been interpreted in so many different ways, especially in the recognition of the usefulness of matching processes. The reason of such an ambiguity related to the matching principle depends on the fact that it has been often modified to provide the accounting information required at a given period of time. Moreover, since the late 1970s, accounting standards have taken a deliberate and far-reaching turn away from matching as the fundamental concept in the determination of earnings, toward a more balance-sheet-based model for the determination of income.

In such settings, taking for granted that earnings are the primary product of accrual accounting obtained through the implementation of the revenue recognition principle and the matching principle, it seems not surprising that there is a huge heterogeneity among the studies that analyze the information content and the usefulness of accruals and earnings.

CHAPTER III

A Renewed Interest on the Fundamentals of Accounting: the Role of Matching

1. The evolution of matching process

Taking for granted that the primary product of accrual accounting is net income to be used as a better measure of performance (Graham et al., 2005), one of the main goals of this kind of financial reporting system is to provide useful information about earnings and its components.

However, the usefulness of earnings depends on its quality that, in turn, depends on the quality of its components⁶⁵. Given that the realized cash flows sub-component of earning is the most reliable element of the financial reporting activity, it goes that the usefulness and the quality of earnings depends on the quality of the accrual sub-component.

As mentioned in the first chapter, the quality of accruals can be influenced by both firm's economic fundamentals and the managerial discretion embedded in their recognition⁶⁶. Nevertheless, besides these exogenous factors, another primary issue concerns the ground rules of the accrual accounting system. Specifically, the endogenous factors that affect the quality of accruals and, in turn, the quality of earnings are represented by the two main processes which guide the

⁶⁵ See Chapter I for the accrual process formalization that lead to earnings and its component.

⁶⁶ See Par. 3, Chapter I.

production of accounting numbers under the accrual reporting system: the revenue recognition and the matching process⁶⁷.

Since the link between expenses and revenues is one of the basic concepts underpinning accrual accounting, the matching process has been defined as the central purpose of accounting, becoming the basic concept in the determination of periodic income (Littleton, 1953). However, it is also true and has to be considered that various issues have been raised about the usefulness of matching. In connection with this, the most often raised issue, around which all kind of debates can probably be proposed, refers to the understanding of what matching means, depending on who is discussing about it. Specifically, it seems that the only reason why matching has been interpreted in so many different ways is that, in assessing the usefulness of matching processes, it has been modified to provide the accounting information required at a given period of time.

Starting from 1940, Paton and Littleton stress the periodic profit and loss calculation from the perspective of stewardship assessment, and adopt the historical cost accounting relying on the assumption according to which the historical cost is a more verifiable and objective evidence. As stated by Paton and Littleton (1940) '*the primary purpose of accounting, [...], is the measurement of periodic income by means of a systematic process of matching costs and revenues*'⁶⁸. According to the authors, the usefulness of matching principle can be viewed as a necessity for periodic profit and loss calculation in order to obtain a

⁶⁷ See Par. 3, Chapter II.

⁶⁸ In their matching process, revenue is recognized under the realization principle that requires converting products into cash or other valid assets, while the expense recognition involves three steps: (i) ascertaining and recoding costs as incurred; (ii) tracing and reclassifying costs in terms of operating activity; (iii) assigning costs to revenues.

benchmark to assess the efficiency of management. In this sense, the difference between business effort (expenses) and accomplishments (revenue) reflects management efficiency, and this information is critical for investors to assess manager's stewardship.

Later, in a period of fluctuating prices, Edwards and Bell (1961) proposed a refined process of matching expenses with revenues. Specifically, in order to overcome the doubts about the adequacy of the profit and loss calculation structure based on the traditional historical cost accounting during a period of market fluctuation, they proposed to adopt current value accounting in expenses calculation while maintaining the traditional profit calculation framework. Moreover, according to Edwards and Bell (1961), for appropriate management decision-making during a period of price fluctuations, productive activity (that yield a profit by combining or transforming factors of production into products) must be separated from holding activity (that yield a gain because the prices of assets rise), and there must be a clear separation between the profit earned from each of those activities. The way of thinking behind Edwards and Bell (1961), advocating current value accounting, is to achieve accurate profit calculation that takes into account market prices fluctuations. In connection with the business profit calculation, current operating profit is calculated by matching current values (revenues) and current costs (expenses) generated by the productive activity. For holding activity, instead, realizable cost saving is calculated by comparing current costs of the period with those of the previous periods. Current value, on the other hand, is nothing but sales from (realized) revenues. Therefore, matching expenses

with revenues in Edwards and Bell (1961) requires not just a causal relationship between expenses and revenues, but matching at the same price level as well.

Relaying on the thought of Edwards and Bell (1961), The American Accounting Association (AAA, 1965) proposes the separation of current operating profit and holding gain, and states that the role of accounting is to convey private information that allow the understanding of the various operations of a company. In addition, such information should be useful for managers, owners and other stakeholders during their decision making process and for the judgment about the firms' performance.

Highlighting the importance of measuring the efficiency of the various operations carried out by a firm, Bedford (1965) further divided the two categories of production and holding activities put forward by Edwards and Bell (1961), and developed a matching process for each of the company's operations. In this sense, Bedford (1965) assumes earnings to be a tool to evaluate the administrative process. Therefore, he divides the business process into several areas: (i) financing from investors and creditors, (ii) acquisition operations for employees, raw materials, and other business resources, (iii) holding business resources, (iv) production operations, (v) sales operations, and (vi) distribution of income to shareholders. Among these, areas from (ii) to (v) are defined as income-generating operations by which operational efficiency should be appraised. Consequently, Bedford (1965) modifies the matching process to enable the assessment of the efficiency of each income-generating operation. Moreover, as Edwards and Bell (1961), Bedford (1965) advocates the separate recording of holding gains and losses.

A completely different way of thinking was, then, introduced by Storey (1978). Specifically, he criticizes the traditional matching process, pointing out that an inadequate one bears a heavy responsibility for inadequate profit calculation in modern accounting. He also highlights the limitations within the realization concept and other traditional accounting principles. Indeed, Storey (1978) states that following the traditional matching process:

- the information provided are backward-looking, and cannot be used in a future-oriented decision making process;
- under the realization basis, even though the time revenues recognition is arbitrary, it has a major impact on income decisions;
- assets values are not reported in the balance sheet;
- expenses calculation also contains such arbitrariness.

Relaying on these assumptions, Storey (1978) suggested that the revenues recognition process should be based on the reassessment of net realizable values, in order to overcome such arbitrariness and reach the properly reporting of assets value in the balance sheet. This means that revenues recognition is based on the progress in the manufacturing process, while expenses are allocated to a given period without considering the recognition of revenues. Following the Storey (1978) way of thinking about the implementation of matching process, revenues are viewed as being created by expenses generated during the reference period, so the result is that revenues should be matched with costs, and all expenses are seen as being costs of the period: this means that revenues and expenses are matched on the basis of a correlation arising during the same period.

2. The matching process through the revenue/expense model and the asset/liability approach

Beside the different interpretation of matching process that followed the need to provide specific accounting information required at a given period of time, another fundamental issue, that has been pointed out, refers to the differences in matching process between the revenue/expense and the asset/liability models.

The revenue/expense (or income statement) approach views the identification of revenues, expenses, and earnings, as the primary goal of financial reporting. In particular, the main goal is represented by the proper determination of the timing and magnitude of revenues and expenses, while the balance sheet accounts and amounts are secondary and derivative. In such settings, the two major guiding principles are the revenue recognition and the process of matching expenses with revenues. Specifically, under the traditional matching process, calculating the proper periodic profit is seen as the foremost priority, so assets are not defined from the perspective of the existence of the future economic resource, but are viewed as revenue charges in suspense that deviated from the matching relationship with current revenues in the process of properly matching revenues and expenses. Therefore, the aim of accounting is to book accruals, which properly record the timing of economic achievements (revenues recognition) and the alignment of associated expenses (matching process). Consequently, the balance sheet accounts and amounts are mostly the residual of such a process, and assets and liabilities are in essence the cumulative effect of periodic accruals. As a result, in order to ensure proper matching and avoid distortion of earnings, the

balance sheet contains not only assets and liabilities, but also certain accrued costs and revenues, and deferred charges and credits (Belkaoui, 2004).

In contrast, the essence of the asset/liability (or balance sheet-based) approach is based on the proper valuation of assets and liabilities as the primary goal of financial reporting, with the determination of other accounting variables considered as subsequent and derivative. The main implication of this perspective is that the determination of income statement amounts and especially earnings is governed by balance sheet considerations. In fact, the balance sheet approach relies on the assumption according to which the proper determination of assets and liabilities leads the determination of earnings, which are simply viewed as the change in net assets over a certain period (adjusted for distributions and contributions from equity holders)⁶⁹.

Although there is an inherent conceptual tension between these two approaches, in practice financial accounting has always been a pragmatic compromise between them (Dichev, 2008). However, it has to be noted that, while the income statement view of financial reporting historically dominated theory, practice, standard setting, and pedagogy all the way until the mid-1970's, an important new stage in the development of accounting was set in 1973, with the start of FASB's reign as the official standard setter in the U.S.

In particular the board quickly reached two conclusions. Specifically, it recognized that the income statement and the balance sheet approaches are the two major alternatives of financial reporting. However, in order to ensure conceptual clarity and internal consistency, the FASB also stated that the two

⁶⁹ This view of earnings has strong underpinnings in economics, where it is known as 'Hicksian income'. See Brief (1982) for a review of Hicks' views on accounting.

approaches has to be considered as alternative, avoiding a muddled compromise between them. Against this background, the FASB reached a major decision in the late 1970's, stating that the balance sheet approach is the only logical and conceptually sound basis of accounting and, therefore, the asset/liability approach should become the cornerstone of standard-setting and financial reporting⁷⁰.

According to Dichev (2008), the FASB's reasoning can be summarized as follows: earnings is a 'change in value' concept, and it is impossible to define a 'change in value' concept before one defines what 'value' is. Therefore, the determination of assets and liabilities logically precedes and supersedes the determination of earnings, which implies that the balance sheet approach is the natural basis of accounting. In contrast, the income statement approach is conceptually suspect because it relies on vague concepts like matching. Moreover, the implementation of the revenue/expense model results in deferrals and accruals, which create assets and liabilities of questionable substance.

During the years that followed, accounting standard setters have been expanding and solidifying the asset/liability approach on several dimensions. First, there has been a gradual transition of older rules to conform to the new conceptual framework. Second, the FASB has been increasingly adopting more pure and extreme forms of the balance sheet approach, particularly with the broad initiative for moving to 'fair value' accounting. Moreover, the balance sheet approach has also expanded geographically, moving from its U.S. roots to international standard setting, and in the process becoming the dominant world-wide

⁷⁰ Storey and Storey (1998), Bullen and Crook (2005) and other accounts of this decision clearly indicate that the main reason for this conclusion was the perceived conceptual supremacy of the balance sheet approach.

accounting doctrine today. In fact, the FASB has always been a model for international standard setting and when the International Accounting Standards Committee (IASC) was founded (in 1973) adopted a conceptual framework that was heavily based on FASB's one, adopting the balance-sheet model of reporting. Then, the IASC was replaced in 2001 by the International Accounting Standards Board (IASB) that joined the FASB in coordinating their philosophy and activities, adopting in 2002 a formal memorandum known as 'The Norwalk Agreement', which details their joint commitment to convergence of U.S. and international accounting standards. Since such convergence is only possible under shared conceptual foundations, the two Boards share a firm commitment to the balance sheet approach.

However, it has to be pointed out that the aforementioned choices of the international standard setters are also coming in for severe criticism. In particular, the critique to the standard setters is perfectly summarized by Dichev (2008) and is built around the four main themes:

- *the balance sheet approach is problematic because it is at odds with how most businesses operate, create value, and are managed.*

The point is that if firms operate as a process of advancing expenses to earn revenues, and assets have a secondary and supporting role in this process, then proper accounting needs to reflect and follow this reality, that implies a natural and logical supremacy for the income statement view of financial reporting. The main problem with the balance sheet approach is that it is largely silent about the notions of business model and business performance, which are central to a firm's success and value-creation. Therefore, for most

firms the value of their resources comes from value-in use and not from value-in-exchange, because the firm is a process and not a collection of ‘things’, implying that the income statement model is the natural foundation for financial reporting⁷¹.

- *The alleged conceptual superiority of the balance sheet approach is unclear. If anything, one can argue that the concept of income provides a clearer and stronger foundation for financial reporting.*

The FASB/IASB consider the concept of ‘asset’ as the most important and fundamental in accounting, and other concepts as derivative and secondary to it⁷². Specifically, the FASB/IASB argue that asset-oriented accounting is superior to income-oriented accounting because one needs to define assets before one can define earnings, but then they proceed to define assets in terms of expected earnings⁷³. Therefore, although the standard setters seem to suggest that the two concepts can be divorced and one can be made primary and superior to the other, the point is that the concept of asset and income are inextricably connected.

- *The balance sheet accounting is likely a major contributor to the substantial temporal decline in the forward-looking usefulness of earnings.*

Investors use earnings as the primary metric to evaluate prospective and existing investments. However, the notion of earnings that investors find

⁷¹ Note that a large minority of business activities and whole businesses do follow a process of value creation which has a balance sheet orientation, and where balance sheet-based accounting is sensible (an example is a firm whose only assets are marketable securities).

⁷² Cfr. Storey and Storey (1998), and Bullen and Crook (2005).

⁷³ The FASB/IASB define assets as ‘probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events’.

useful is not ‘changes in assets’ but ‘recurring earnings’, essentially the current earnings that are the best predictor of the future earnings and cash flows. Thus, while for investors good earnings means a metric that is highly persistent and predictive of future earnings, the balance sheet approach views assets as the store of value and earnings as ‘changes in net assets’, which implies low persistence and predictability of earnings. This means that the balance sheet approach creates earnings, which are at odds with what investors consider ‘good earnings’.

- *There are substantial problems with applying the balance sheet-based model of accounting in practice.*

The weakness of the ‘mark-to-model’ approach is that it involves considerable managerial discretion with respect to inputs, and consequently the potential for large estimation errors and outright manipulation⁷⁴. Moreover, balance sheet-based accounting, and especially its more extreme forms of mark-to-market and fair-value accounting, create a feedback loop between financial markets and the real economy, and may possibly lead to or exacerbate market bubbles.

In response to the criticisms to the choices of the IASB and the FASB, and therefore to the asset/liability approach, some scholars highlights that the significance of the matching process is still recognized under current value accounting as well. In fact, according to Kvitte (2008), the asset/liability approach has been, and to some extent still is, misunderstood, because even if there are substantial differences between the balance sheet model and the revenue/expense

⁷⁴ See Palepu and Healy, 2003.

view, there is a tendency to attempt to find differences that do not exist (Sprouse, 1978; Bullen and Crook, 2005). In fact, it has been said that the purpose of the asset/liability view is to downgrade the importance of income and the income statement by making the balance sheet more important than the income statement (Kirk, 1998). Others have claimed that the intent of the asset/liability model is to supplant accounting based on completed transactions and matching of expenses and revenues with an accounting based on the valuation of assets and liabilities at current or fair values, labeling it as a 'valuation approach' (Storey and Storey, 1998). However, according to Healy and Wahlen (1999), the leading standard-setters do not ignore the emphasis on performance measures of the primary users of financial reports, and the conflict is rather how to achieve the best performance measures. In fact, given that the FASB states that the issue is how income is manifested (FASB, 2004a), Kvitte (2008) conclude that the importance of net income is therefore not a matter of disagreement between the two groups.

Moreover it has to be noted that, since the matching process is considered as the basic concept for recognition in the revenue/expense model, according to the IASB and FASB conceptual frameworks it may also play a role in the asset/liability approach. However, matching is modified by the asset and liability definitions, given that costs should be expensed in the same period as the revenues that result from the expenditures, but only to the extent that the corresponding balance-sheet items meet the asset/liability definitions (IASB, 1989).

Overall, whether the spread of the asset/liability approach has sidelined the concept of matching, or it has simply modified its application, the impact of such changes on the quality of accounting numbers is still an empirical matters.

3. Trends in the degree of matching: determinants and effects

Although it was a broadly analyzed topic until the '70s, there has been little research effort aimed at matching in the last 20 years (Dichev and Tang, 2008).

According to Dichev and Tang (2008), one of the reasons related to this lack of research is that in earlier years the dominant paradigm of market efficiency implied that the market fully relies on accounting conventions and practices aimed to measure firms performance. In fact, it is only quite recently that there has been a renewed interest into fundamental analysis, that is a research stream related to the study of whether and how the knowledge on accounting yields superior insights into firm performance and security valuation (e.g., Fairfield et al., 1996; Sloan, 1996; Piotroski, 2000; Nissim and Penman, 2001; and others)⁷⁵.

Another reason for the relative lack of research about the matching process is the aforementioned evolution of accounting standards. Indeed, while early standards recognized the importance of matching on both conceptual and practical level, during the last two to three decades the FASB and the IASB have adopted a perspective where the determination of income is viewed more as resulting from revisions of asset and liability values rather than as the residual from revenues and matched expenses (Storey and Storey 1998).

In the spirit of fundamental analysis, it seems that the study of matching, and its determinants and consequences, can be viewed as a further step into enriching the knowledge about the determination and the properties of earnings. In particular, there are three studies that are close to the spirit of this kind of research. Such

⁷⁵ Dechow and Schrand (2004) provide a useful overview of this research stream.

strand comprises Su (2005) and the related studies of Lane and Willet (1999) and Gibbins and Willet (1997).

The *fil rouge* of these studies is based on the idea according to which a proper matching of revenues and expenses has a smoothing effect on earnings, that is beneficial because it allows for better estimation of long-run economic profitability. Therefore, they conclude that matching, as well as conservatism and other accounting practices, are not merely ad hoc or traditional rules which accountants arbitrarily apply, but have rational bases in the sense that they can allow a better decision making process (Su, 2005).

Recently, through an historical retrospective on matching, which includes a review of more contemporary research and thought, Zimmerman & Bloom (2016) also confirm that matching, as an approach to income measurement, can be helpful in forecasting earning power. Consequently, they conclude that matching should be retained as a long-standing fundamental accounting principle in standard-setting and in practice.

Moving from the studies that support matching principle as a desirable practice that allows to obtain more useful and informative accounting numbers, and motivated by the aforementioned relative lack of recent research aimed at matching, some authors have tried to deepen the knowledge about this topic analyzing trends, and potential determinants and consequences.

The reference study in this ‘new’ field is the analysis of Dichev & Tang (2008), who present a theory of matching and its effects on accounting variables. The principal insight of the theory is that poor matching acts as noise in the economic

relation of advancing expenses to earn revenues⁷⁶. Empirically, they concentrate on time-series specifications using a sample composed by the 1,000 largest U.S. firms (for 34,785 observations) from 1967 to 2003, and measure matching as the coefficient on current expenses in a regression of revenues on past, current, and future expenses⁷⁷. Findings reveal a clear and economically substantial declining trend in the contemporaneous correlation between revenues and expenses, and an increase in the non-contemporaneous correlation between revenues and expenses. Therefore Dichev and Tang (2008) highlight a decline in matching, such that an increasing amount of expenses is being recognized before and after the period in which it affects revenues.

Similar trends in the evolution of matching has been documented by other subsequent studies. Specifically, building on Dichev and Tang (2008), Donelson et al. (2011) selected a sample which consists of 32,645 U.S. firm-year observations between 1967 and 2005, and that is generally consistent with the sample in Dichev and Tang (2008). Next, they estimate a cross-sectional regression which is identical to the regression model reported in Dichev and Tang (2008). As described by Dichev and Tang (2008), Donelson et al. (2011) documented a decline in the contemporaneous association of revenue and expense, and an increase in the lag (lead) coefficient.

Murdoch and Krause (2012) also analyze the U.S. market but they begin their investigation with 1987 data and, to allow for comparisons with earlier research, extend the analysis period through 2005, including all firms for which pertinent

⁷⁶ See Par. 1.1 and 1.2, Chapter III.

⁷⁷ $Rev_{i,t} = \gamma_0 + \gamma_1 Exp_{i,(t-1)} + \gamma_2 Exp_{i,t} + \gamma_3 Exp_{i,(t+1)} + \varepsilon_{i,t}$

data are available rather than limiting the sample to large firms. In order to assess the degree of matching, Murdoch and Krause (2012) observe the correlation between revenues and two expenses measures from the 1987-1996 period and compare it to the correlation for the 1997-2005 period, adopting the same methodology of Dichev and Tang (2008). As a results, their findings also highlight a worsening in the degree of matching between revenues and expenses recognized in the same period.

Still focusing on the U.S. settings, Bushman et al. (2013) built a sample that consists of 228,847 firm-year observations from 1964 to 2012 and, still employing the same technique used in Dichev and Tang (2008), confirm the declining trend in matching between revenues and expenses as documented in previous studies.

Further, using a sample composed by 189,608 U.S. firm-year observations with valid data from the years 1970 through 2009, Srivastava (2014) replicates the model proposed by Dichev and Tang (2008) and obtain similar results in terms of declining matching between current revenues and expenses. Moreover, splitting the sample in two groups of firm he shows that for the new-firm segment, the average matching declines from 1.05 to just 0.59, while the average revenue-expense matching of the seasoned-firm segment declines by much less, from 1.05 to 0.94. As a result, he confirms a declining trend in matching current revenues and expenses, but also highlights that, relative to the seasoned-firm segment, the average matching for the new-firm segment's is 37% lower.

In the same year, Kagaya (2014) examine changes in the relation between revenues and expenses over the last 16 years around the world. In particular, the final sample consists of 282,873 firm-year observations for the fiscal years 1991-

2008, relative to 30,537 non-financial firms across nine countries⁷⁸ which, in turn, are clustered in different cultural areas according to the definition of cultural area from Djankov et al. (2008). Referring to the matching measures proposed by Dichev and Tang (2008), Kagaya (2014) confirms that the correlation between revenue and expense has declined around the world, and shows that such a trend is stronger among the English speaking countries.

Along the lines of these studies, He & Shan (2015) measure matching by the contemporaneous correlation between revenues and expenses. Relying on a sample that includes 42 countries, they estimate the annual matching coefficient from 1991 to 2010, and find that the decline in matching is not unique to the United States, but a worldwide phenomenon during this period⁷⁹.

The only dissenting voice in this strand of research belongs to Jin et al. (2014), who examine changes in the matching between contemporaneous revenues and expenses in Australian financial reporting. Specifically, their results indicate that the revenue-expense relation has declined in Australia during 2001-2005, but improved in more recent years.

Overall, looking at these studies focused on the identification of trends in the degree of matching, it seems clear that the major issue is related to a worsening of the relation between current revenues and expenses, which has been documented in different settings with the only exception of the Australian one, examined by Jin et al. (2014). However, the mere detection of these changes could be not fully revealing without a careful analysis of both possible determinants and

⁷⁸ Canada, China, Germany, France, India, Japan, Korea, the U.K., and the U.S.

⁷⁹ According to the Authors, the average matching coefficient has decreased significantly from 0.886 in the 1990s to 0.801 in the 2000s.

consequences related to such declining trend in one of the milestones of accrual accounting, such as the process of matching revenues and expenses.

3.1 Determinants of changes in the degree matching

According to Dichev and Tang (2008), the possible determinants of the combined evidence that suggests a worsening of accounting matching over time can be identified in both the accounting system evolution and innate economic factors.

The reason underpinning this idea is due to the behavior of accounting standard setters that, since the late 1970s, have taken a deliberate and far-reaching turn away from matching as the fundamental concept in the determination of earnings and toward a more balance-sheet-based model of the determination of income⁸⁰.

On the other hand, the authors are also aware that changes in the real economy, toward more fixed costs and R&D activities, can also imply a temporal decline in matching success, and that there is little that financial reporting can do about the nature of these changes *per se*. However, Dichev and Tang (2008) suggest that changes in the real economy have played a secondary role in the evolution of the properties of earnings. In addition, the authors state that if the point is ‘what can be done to counter the effect of these changes on the informativeness of earnings’, then the answer and the discretion lie again in the design of the financial reporting system and its relevant bodies.

Anyway, besides such theoretical aspects, the conclusions of Dichev and Tang (2008) are not merely conjectures, inasmuch they rely on the empirical evidence of their analysis. However, to date, Dichev and Tang (2008) remain the only ones who ascribe the declining in matching to the accounting system’s ground rules.

⁸⁰ See Dichev (2008) for a better understanding of this topic.

In fact, Donelson et al. (2011), using a simple decomposition framework, show that the decline in the relation between current revenues and expenses is attributable primarily to a single income statement line item, namely special items, and not to systematic issues across multiple line items in the income statement. Moreover, although the ‘weight’ of special items as a component of total expenses has increased with the incidence of special items over time, decreasing the relation between current revenues and total current expenses, empirical evidence suggests that changes in the frequency of economic events associated with special items have played a more important and sustained role relative to the role played by the adoption of individual accounting standards.

Results from Donelson et al. (2011) are then indirectly confirmed by Murdoch and Krause (2012), who conclude that recurring earnings (that does not include the effect of special items) are preferred to an earnings number that includes the impact of special items.

An alternative explanation, to the declining in the relation between revenues and expenses, is offered by Srivastava (2014). In particular, he highlights that, in his sample, each new cohort of listed firms exhibits a lower degree of matching than its predecessors, mainly because of higher intangible intensity. Therefore, Srivastava (2014) concludes that the trend of decline in matching is due more to changes in the sample of firms than to changes in generally accepted accounting principles or in the quality of matching process of previously listed firms.

A totally different position from Dechow and Tang (2008) is also assumed by He and Shan (2015), who analyze the impact of IFRS adoption on matching and do not find any significant result, excluding that changes in reporting system have a

primary role in determining changes in the degree of matching between current revenues and expenses. Further, they examine several economic factors as potential determinants of matching, including the proportion of firms reporting large special items, the national economic growth, the weight of the service industry in a country's gross domestic product (GDP), and the intensity of R&D activities. Specifically, findings highlight that matching is weaker in countries where more companies report significant special items, GDP growth rates are low, more R&D activities are present, and the service sector accounts for a larger portion of the economy. Therefore, these results support the view that real economic factors are important determinants of matching. Finally, He & Shan (2015) also consider whether country-level governance quality affects matching between revenues and expenses, and show that the contemporaneous revenue-expense relation is weaker in countries with common law legal origins and stronger investor protections. However, in these countries, there is a stronger association between past expenses and current revenues, implying that expenses are more likely to be recognized before the associated revenues⁸¹.

Even more diametrically opposite to Dichev and Tang (2008), there is the study of Jin et al. (2014). In fact, as viewed in the previous paragraph, they detect an increasing trend of matching between contemporaneous revenues and expenses for the Australian context, but only after the mandatory adoption of IFRS. Therefore, they suggest that changes in accounting rules have positively affected the matching process effectiveness.

⁸¹ This finding is consistent with Ball et al. (2000), and Bushman and Piotroski (2006), who report that asymmetric loss recognition, a commonly used measure of accounting conservatism, is greater in countries with stronger investor protection.

Overall, a wide range of determinants has been proposed in order to justify the detected trend of matching and there seems to be no prevailing ideas among them.

3.2 Consequences of changes in the degree of matching

In addition to the determinants of changes in matching effectiveness, another fundamental issue is the analysis of the consequences of the modified degree of correlation between revenues and expenses.

The essence of the milestone of this research stream (Dichev and Tang, 2008), is that mismatched expenses act as noise in the economic relation of advancing expenses to earn revenues, and therefore poor matching decreases the contemporaneous correlation between revenues and expenses. However, Dichev and Tang (2008) also documented an increased volatility of earnings, a declining persistence of earnings, and an increased negative autocorrelation in earnings changes⁸². Therefore, looking at the combined evidence of their study, Dichev and Tang (2008) suggest that accounting matching has become worse over time and that this trend had a pronounced effect on the properties of resulting earnings. Therefore, since earnings is the most widely used accounting number, these results also suggest that a consideration of degree of matching effectiveness can bring useful insights to financial reporting users.

The same view can be detected in Murdoch and Krause (2012), who employ a cash flow prediction criterion to investigate whether the decrease in matching has compromised earnings' usefulness in forecasting future cash flows. In particular, their results indicate that earnings from earlier periods, in which matching was

⁸² Dichev and Tang (2008) also highlight that there are none of these temporal patterns in cash-based measures of revenues, expenses, and earnings.

better, can be used to make more accurate predictions of operating cash flows, relative to earnings from later periods with poorer matching. Therefore, Murdoch and Krause (2012) conclude that the documented decline of matching damages the ability of earnings to aid in the prediction of future cash flows, thus being at odds with the primary purpose of financial statements.

A different position is assumed by Bushman et al. (2013), who examines the timing role of accrual accounting and show that the timing role of accruals has dramatically declined over the past fifty years and has largely disappeared in more recent years. However, in exploring several potential reasons for such observed attenuation, they find that the decline in matching between revenues and expenses is less drastic than the decline in the timing role of accrual accounting. Furthermore, they highlight that the effect of the mismatch on the attenuation of the timing role of accruals is subsumed by the effect of the changes in cash flow volatility⁸³. This means that Bushman et al. (2013) do not believe that a worsening in the degree of matching affects one of the basic functions of accrual accounting. Srivastava (2014), on his own, analyze some determinants of the deterioration of the quality of earnings, considering matching as one of the of earnings quality components. However, although he confirms that there has been a decline in matching between revenues and expenses, he fails in neglecting the possibility that matching, as a ground rule of accrual accounting, could act as a moderator between the determinant of the documented erosion of earnings quality and the

⁸³ Empirical results are consistent with the idea that the decline in the matching between revenues and expenses over time contributes to the loss of the timing role of accrual accounting. However, the coefficient on the matching trend variable remains negative and statistically significant (revealing that that only about 19% of the timing role decline is related to documented mismatch between revenues and expenses) and it becomes statistically insignificant, whereas the coefficient on cash flow volatility remain highly significant.

earnings quality measures and attributes. Consequently, the analysis is not able to prove if the downward trend of matching could have had some consequences on the quality of accounting numbers.

Going on, Kagaya (2014) investigates the relation between earnings smoothness and matching, and analyzes the relation between current accruals, and current and next cash flows from operations. Evidence shows that the degree of matching is positive related to the stability of earnings. Therefore, Kagaya (2014) states that matching contributes to the presentation of permanent incomes, controlling for the volatility of earnings. Moreover, his results suggest that the accrual process, supported by matching and accruals, improves earnings smoothing and the signaling ability of future cash flows.

Overall, among these studies, that analyze the effects following the declining in matching revenues and expenses, the prevailing idea is that a higher degree of matching is a desirable quality to obtain more informative and useful earnings.

4. Summary and next developments

Among the research stream focused of the fundamentals of accounting, there are few studies that joined a renewed interest into the process of matching expenses with revenues, in order to analyze its evolution and detect possible determinants and consequences of changes in a basic accounting rule in standard-setting and in practice. However, even if there are not so many scholars that joined this new ‘dear old’ topic, the heterogeneity in results and ideas is quite deep, especially with regard to the determinants of the detected trends of matching process.

In fact, except for one study (Jin et al., 2014), a considerable downward trend in the matching process effectiveness has been clearly documented considering different temporal and contextual settings.

However, the real ‘bone of contention’ is related to the determinants of such evolution. Indeed, the worsening in the degree of matching between current revenues and expenses could have been due to changes in the accounting system (Dichev and Tang, 2008), the country-level governance quality (He and Shan, 2015), methodological issues (Srivastava, 2014), and real economy factors that, in turn, are related to special items (Donelson et al., 2011; Murdoch and Krause, 2012; He and Shan, 2015), intangible intensity (Srivastava, 2014), the national economic growth, the weight of the service industry in a country’s gross domestic product, and the intensity of R&D activities (He & Shan, 2015).

On the other hand, the prevailing idea is that the declining in matching effectiveness is assumed to have caused a deterioration in the properties of earnings in terms of earnings quality and earnings usefulness. The former is due to an increased volatility of earnings, a declining persistence of earnings, and an increased negative autocorrelation in earnings changes (Dichev and Tang, 2008), while the latter is linked to the worsening in the ability of earnings to aid in the prediction of future cash flows (Murdoch and Krause, 2012), and a decline in earnings smoothing and its signaling ability of future cash flows (Kagaya, 2014). However, according to Bushman et al. (2013) the decline in matching between revenues and expenses is less drastic than the decline in the timing role of accrual accounting and, therefore, it does not significantly affect one of the basic functions of accrual accounting.

Overall, the review of the aforementioned studies highlights that there are so many issues that can be explored in order to deepen the importance of matching principle in modern accounting. In fact, which are the drivers of changes in matching and to which consequences they lead is still an empirical matter. Moreover, given that almost the whole literature is focused on the U.S. and FASB settings and that all previous studies are focused on public companies, there are so many possibilities of analysis aimed to enrich in a broad way this research stream. For these reasons, next chapter will present an empirical study aimed at deepening the understanding on trends and consequences of matching process, through a double step analysis. The first one will be focused on the effect that changing in the financial reporting system, from a revenue/expense model to an asset/liability approach, could have had on the process of matching contemporaneous revenues and expenses. Further, the second step on analysis investigate the direct and the indirect impact that changing in the degree of matching can have on the quality of accounting numbers, in order to understand if the matching concept can be still considered as desirable as some scholars says.

CHAPTER IV

The Impact of Different Accounting Systems on the Degree of Matching and Its Effects on Earnings Attributes: an Empirical Analysis

1. Research objectives and hypotheses development

Despite the assumption according to which the accrual reporting system provides better performance measures and useful accounting information through earnings, previous literature on this topic has highlighted very mix findings due to the great heterogeneity of analyzed settings⁸⁴. Moreover, it has to be noted that the usefulness of accounting numbers depends primary on their quality that, in turn, can be influenced by both exogenous factors (firms' economic fundamentals and managerial discretion)⁸⁵ and endogenous factors (the reporting system's ground rules), to be considered as determinants of earnings quality.

In connection with the endogenous factors, a niche strand of research has shown a renewed interest into fundamental analysis and highlights that there has been a considerable downward trend in the effectiveness of the basic rules of accrual accounting: revenue recognition, matching, and timing. However, even if there are not so many scholars that joined this topic, the heterogeneity in results and ideas is quite deep, especially with regard to the determinants and the consequences of the detected declining trends⁸⁶. In particular, changes in the accounting systems

⁸⁴ See Chapter II for a comprehensive literature review on the topic.

⁸⁵ See Par. 3, Chapter I for a further discussion of the topic.

⁸⁶ See Par. 3, Chapter III for a further discussion of the topic.

can be considered as the most compelling and controversial topic, when analyzed in connection with the quality of accounting numbers and its fundamentals⁸⁷.

Therefore, given that this topic is still an empirical matter and far from being undisputed, this study deepens the consequences of a change in the financial reporting system on the effectiveness of the process of matching expenses with revenues. Further, the subsequent step of analysis aims to assess the effect that the possible different degree of matching could have on the quality of accounting numbers, controlling for a set of variables that might affect both matching process and earnings quality. Specifically, the focus of the second step of analysis will be explored in two ways:

- indirect assessment of the impact that a different degree of matching effectiveness can have on the quality of accounting numbers, through the analysis of changes in earnings quality attributes that follow a change in the accounting system (Dichev and Tang, 2008);
- direct assessment of such relationship, thanks to a readjustment of the classical earning quality models in which a measure of the degree of matching effectiveness is set among other determinants of earning quality.

Therefore, the indirect method assumes that if different accounting systems lead to different degree of matching effectiveness, and if the former also imply changes in earnings quality, then the degree of matching effectiveness affect the quality of accounting numbers. However, despite the theoretical thesis that can be provided in support of such (indirect) relationship, it has to be noted that it is still a deductive idea which can lead to biased conclusion inasmuch changes in

⁸⁷ See Par. 2 and Par. 3, Chapter III for a further discussion of the topic.

accounting systems can influence both the quality of accounting numbers and the degree of matching effectiveness without a direct empirical correlation between matching and earnings quality, because of other factors that could affect the quality of accounting numbers but not the degree of matching effectiveness, and vice versa. Therefore, this study sets up earnings quality models that directly assess the impact of changing in matching effectiveness on earnings quality starting from the first step of analysis that highlights possible changes in matching due to a switch in the financial reporting system, on the understanding that there are still many other windows to enrich the analysis.

In order to achieve the aforementioned goals, this study will be focused on the Italian institutional settings in comparing the effectiveness of matching and its impact on the quality of accounting numbers, for a group of private firms adopting an asset/liability approach (A/L) versus firms reporting under a revenue/expense model (R/E). Specifically, the A/L group consists of private firms that voluntarily implemented the IAS/IFRS financial reporting system, while the R/E firms are represented by non listed companies that still adopt the Italian GAAP.

In fact, despite the blurry theoretical and empirical framework discussed in the previous chapter⁸⁸, the recent and almost worldwide IAS/IFRS adoption has certainly contributed to spread the asset/liability reporting system (Camfferman and Zeff, 2007; Kagaya, 2014), creating an ideal (and still unexplored) setting that allow to analyze how the switch from the revenue/expense to the asset/liability reporting system could have affected the fundamentals of accrual accounting.

⁸⁸ See Par. 2, Chapter III.

However, in deepening such a topic, a great care must be taken in the selection of the context to be analyzed, in order to avoid erroneous interpretations that could be primarily due to the pre-existing institutional settings. In fact, Jin et al. (2015), in analyzing the changes in matching between revenues and expenses following the IAS/IFRS adoption in Australia, are not able to fully assess the impact of the shift from a revenue/expense to an asset/liability model, given that the latter has always been traditionally rooted in their reference context. In addition, beside He and Shan (2015) develop a cross-country analysis on the same topic, their research methodology, specifically designed to rule out the possibility of spurious correlation and mitigate the influence of exogenous events that can affect the time-series trend in matching, does not enable to capture the effects in countries whose national GAAP were closer to the revenue/expense model before the IAS/IFRS adoption. Therefore, given that the Italian accounting system is traditionally oriented toward a revenue/expenses model (Nobes, 2001; Corbella and Florio, 2010; Alexander et al., 2012), the choice of such specific context helps to better appreciate the effect of the switch from a specific financial reporting system (R/E) toward another one with sharp differences in its basic rules (A/L)⁸⁹. Finally, given that all Italian (as well as European) listed firms have been being obliged to adopt the IAS/IFRS financial reporting system since 2005, it seems to be obvious that the basic sample had to be composed by private firms in order to compare different accounting system implemented in the same context and, above all, during the same reference period⁹⁰.

⁸⁹ See Par. 2.1.2 of this chapter for a detailed description of the reference institutional context.

⁹⁰ See Par. 2.1.1 of this chapter for a detailed description of private firms' characteristics.

Relying on the discussion of the literature focused on the differences between R/E and A/L reporting systems and the related issues, proposed in the previous chapter⁹¹, in order to pursue the preliminary aim of this study the first research hypothesis can be formalized as follow:

Hp1: ceteris paribus, the switch from a revenue/expense model to an asset/liability approach negatively affects the effectiveness of the process of matching contemporaneous revenues and expenses.

The second step of analysis is related to a finer interpretation of the widely analyzed relationship between different financial reporting systems and the quality of earnings. Specifically, through a more classical scheme that indirectly link changing in matching effectiveness to various earnings quality attributes, this study aims to test some models in which the matching process effectiveness, being one of the milestones of accrual accounting, is formally considered as a determinant of the quality of accounting numbers, and not just one of the many earnings quality attributes. However, the great heterogeneity of prior literature's findings and thesis about the correlation between accounting systems, degree of matching, and earnings quality, as discussed in the previous chapter⁹², justify the second non-directional hypothesis:

Hp2: ceteris paribus, changing in matching effectiveness is not systematically related to the quality of earnings and its attributes.

⁹¹ See Par. 2, Chapter III.

⁹² See Par. 3, Chapter III.

2. Research setting and sample selection

This section first provides a dissertation aimed at analyze the research context and the reasons for reaching the choice to study private firms and Italy. Further, there will be an analysis of both the main methodological issues related to this king of research, and the adopted arrangements for improving the robustness of results. Finally, a detailed description of the sampling process is proposed, in order to better understand the preliminary steps of this empirical study.

2.1 Research context

2.1.1 Private firms' characteristics

Given that the main purpose of this study is to examine how a shift from a revenue/expense model (mainly characterizing the Italian GAAP) to an asset/liability model (mainly characterizing the IAS/IFRS) impacts on the fundamentals of accrual accounting, it is not possible to disregard firms' incentives to transparency and high quality financial reporting. Therefore, the choice to examine private companies depends primarily on the need to consider such incentives. In fact, as literature suggests, when firms are forced to use IAS/IFRS, the co-existence of different compliance incentives opens the door for 'label adoptions' or opportunistic manipulation of financial reporting, especially in countries – such as Italy – with low investor protection, low enforcement of accounting standards, high ownership concentration, and smaller stock markets (Soderstrom and Sun, 2007; Dasket et al., 2013; Halabi and Zakaria, 2015). On the other hand, the voluntary IAS/IFRS adoption may result from a real willingness of companies to improve their disclosure quality (Cuijpers and Buijink, 2005; Barth et al. 2008; Christensen et al. 2015), and this is particularly

true if the voluntary IAS/IFRS adopters are represented by firms not controlled by listed companies and, therefore, not involved in a process of IAS/IFRS adoption to comply with parent company requirements and/or simplify the financial reporting procedures (Cameran et al., 2014). The choice to examine private firms is therefore motivated by the possibility to analyse voluntary IAS/IFRS adopters, so assessing the impact of an asset/liability model on the earnings attributes of incentivized firms.

Further, the alternative research strategy (represented by an analysis of listed companies involved in a process of mandatory adoption) not only would have not clarified whether the implementation of the IAS/IFRS accounting model has been due to an incentive action or merely to the need of rules' compliance, but would have also implied an examination of two different periods (before and after the mandatory adoption), so increasing the influence of exogenous and macroeconomic variables (such as the economic-financial crisis) on the quality of earnings, apart from the adopted accounting model. In addition, the choice of private companies (and therefore of voluntary IAS/IFRS adopters) also stems from the desire to fit into a stream of studies that is still underestimated. In fact, the impact of the IAS/IFRS adoption on accounting fundamentals and earnings quality is still an open issue for public companies, but it is even more a pending question for private firms (Orens et al., 2012; Cameran et al., 2014). Therefore, it seems appropriate to analyse the effect of different accounting models (revenue/expense vs. asset/liability) on the fundamentals of accrual accounting for private companies. An analysis of the impact of an asset/liability model over accounting attributes of private firms appears even more useful if one considers

that, as a part of the Responsible Business package with its ‘Think Small First’ principle, the European Commission has recently replaced the IV and VII EU Directive for private companies with the new Accounting Directive 2013/34/EU that seems to adopt a financial reporting model closer to the asset/liability one. Therefore, this study should also be of interest for the EU Commission in evaluating the impact of the current financial reporting regulation.

Overall, the choice of private companies allows to:

- have a sample of ‘incentivized’ voluntary IAS/IFRS adopters (asset/liability model) to be compared with a sample of Italian-GAAP firms (revenue/expense model) in order to properly assess the relationship between different accounting models and earnings attributes;
- implement our empirical analysis through a spatial comparison (rather than a temporal one), so avoiding the aforementioned limits;
- deepen the relationship between accounting models and earnings attributes of private firms which represents an interesting setting for academics, standard setters and policy-makers.

2.1.2 The Italian institutional setting

This study is focused on the Italian context, which corresponds to a typical European code law country (La Porta et al., 1997; et seq.).

The requirements in terms of financial reporting and disclosure for the Italian private firms are grounded on the Italian Civil Code and on the national GAAP (issued by the Italian accounting standard setter: Organismo Italiano di Contabilità, OIC), which provide very detailed and uniform requirements for the

recognition and the measurement of all elements of financial statements, as well as for the presentation of both the balance sheet and the income statement.

Relaying on the financial reporting rules and practices typically adopted, the Italian accounting system is traditionally oriented toward a revenue-expense model (Nobes, 2001; Corbella and Florio, 2010; Alexander et al., 2012). Indeed, driven by the need for proper matching, the Italian GAAP allow for the capitalization of specific deferred charges and credits within the balance sheet (e.g., start-up costs, research costs, advertising and promotional costs, and provisions for restructuring) and do not involve the fair value valuation method for the appraisal of assets and liabilities (Nobes, 2001). A detailed comparison between Italian GAAP and IAS/IFRS shows major differences between the two accounting models, especially concerning the recognition and measurement of operating revenues and expenses. Indeed, with respect to the IAS/IFRS accounting model, Italy is classified as a ‘large GAAP differences’ country, being characterised by opaque earnings and low disclosure quality (Marra et al. 2011; Cameran et al., 2014). Moreover, Ding et al. (2007) ranked Italy 9th and 2nd out of a group of 30 countries respectively in terms of ‘absence’ (which measure the extent to which the rules regarding certain accounting issues are missing in the Italian GAAP but are covered by the IAS/IFRS) and ‘divergence’ (which applies in circumstances where the rules regarding the same accounting issue differ between the Italian GAAP and IAS/IFRS). Consistently, empirical evidence shows that the transition to IAS/IFRS has had a sizeable impact on Italian accounting practices. Cordazzo (2013), through an analysis of the reconciliation statements of 178 companies at the date of the mandatory transition to IAS/IFRS,

demonstrate that the IAS/IFRS adoption has produced significant effects on Italian accounting results and that the IAS/IFRS conversion has meant a deep revision of the Italian accounting system, in particular for intangible assets (including goodwill recognition subsequent to a business combination). Corbella et al. (2013) also demonstrates that the introduction of the IAS/IFRS has determined wide impacts on financial statements. In particular, their analysis highlights the following impact:

- *Revenue recognition* – The implementation of the IAS/IFRS system affects operating revenues due to a stricter application of a principle of accruals basis accounting, as well as the treatment of revenues originating from a deferred payment as separate accounting figures.
- *Impairment of assets* – Operating income is influenced by stricter rules concerning the impairment losses recognized in the income statement based on the impairment test.
- *Share-based payments* – With the implementation of the IAS/IFRS, firms must report such costs in their income statement, whereas the national law and GAAP do not contain any such provisions and do not recognize these costs in their usual procedures.
- *Intangible assets* – The Italian Civil Code requires costs for pure research to be charged to operations when incurred, while costs relating to a specific project and development costs to be capitalized over a period not exceeding five years. On the other hand, IAS/IFRS requires research costs to be expensed, development costs that meet the criteria for capitalization to be

capitalized, and then amortized from the start of production over the economic life of related products.

According to the Italian accounting rules, costs for the establishment of a company, for issuance of capital stock, for new business or new production activities can be recognized as an asset. This recognition is applicable where it is probable that the use of this asset will generate future economic benefits and costs of the asset can be determined reliably. IAS/IFRS, instead, require these costs to be charged against profit and loss account.

In addition, according to the Italian GAAP, goodwill should be subject to systematic amortization for no more than five years after the purchase date. Goodwill is, instead, no longer amortized in a IAS/IFRS accounting environment, but it is subject to impairment test.

- *Tangible assets (leases)* – Operating income is affected by the accounting treatment required by the IAS/IFRS for finance leases.
- *Inventory* – The differences between IAS/IFRS and Italian GAAP mainly concern the evaluation of leftover stock based on cost formulas other than LIFO (which is instead allowed by the Italian GAAP).
- *Employee benefits* – Italian GAAP require the liability for TFR (reserve for employee termination indemnity) and other post-retirement benefits to be recorded at nominal value. According to the IAS/IFRS model, the liability for benefits to be paid on the termination of employment is based on actuarial assumptions.
- *Provisions for risks and charges* – The implementation of IAS/IFRS requires amendments in a financial statement previously based on the Italian

GAAP due to the re-measurement of provisions to be paid over a period of time (according to the Italian GAAP a provision does not require to be discounted), as well as the cancellation of the provisions which do not comply with the requirements set by the IAS/IFRS for their recognition. In fact, the Italian GAAP allow the recognition of provisions when an obligation does not meet such definition criteria at the balance sheet date (for example, provisions for restructuring). Moreover, provisions in the context of a business combination can be more extensive.

Many other differences between Italian GAAP and IAS/IFRS concern the accounting for financial assets, financial liabilities, and income taxes. However, they are not considered here as they do not impact on the operating income.

Most of the differences outlined above (concerning revenue recognition, intangible assets, lease contracts, provisions) support the assumption according to which the Italian accounting model is more oriented towards a revenue/expense approach, whereas confirm the asset/liability approach of the IAS/IFRS model.

However, it has to be pointed out that, because of the implementation of the IAS Regulation (1606/2002), Italian private firms can voluntarily opt for the adoption of IAS/IFRS instead of local GAAP, since 2005. In particular, this represents an important breaking point since it allows the simultaneous assessment of the matching process effectiveness in a context characterized by the coexistence of firms adopting the revenue/expense model (R/E) with companies that follow an asset/liability approach (A/L).

In addition, according to the Italian tax principle of neutrality, an equal treatment is granted for those company adopting IAS/IFRS and those accounting according

to the Italian GAAP (PricewaterhouseCoopers, 2006). Therefore, individual tax issues and, more generally, the peculiarities of the national tax system should not influence the results of our analysis (Cameran et al., 2014).

Overall, the Italian context provides an ideal and extremely important setting to examine the interaction between two different financial reporting systems (IAS/IFRS based on an asset/liability approach vs. Italian GAAP based on a revenue/expense approach) and reporting incentives for private firms. Moreover, the Italian context also represents an ideal institutional setting that allow to mitigate research biases and alleviate methodological issues which typically characterize studies concerning the impact of different financial reporting systems on private companies accounting attributes⁹³.

2.2 Methodological issues

Looking at the controversial nature of findings from previous studies related to the effects of a switch in the financial reporting system, it has to be noted that there are some major concerns that such conflicting results might be mainly related to some research design issues, such as sample heterogeneity, self-selection bias, and survivorship bias.

The sample heterogeneity is related to the adoption of cross-country scenarios, which are likely to produce biased results because of the impact of economic, political, and enforcement differences among countries on firms' financial reporting quality (Ball, 2006; Leuz, 2010). Indeed, Ball et al. (2003) and Leuz et al. (2003) find a direct relationship between the quality of earnings and the

⁹³ See the next paragraph (2.2).

strength of country-level investor protection mechanisms⁹⁴, while He and Shan (2015) show a lower degree of matching in countries with common law legal origins and stronger investor protection. Therefore, focusing the analysis on the Italian context, this study overcome this possible distortion, thanks to the homogeneous regulation shared over time by all Italian private firms involved.

The self-selection bias, instead, typically affects studies on private firms that voluntarily adopt IAS/IFRS and is connected to the existence of peculiar characteristics distinguishing preparers who switch to IAS/IFRS from other constituents. Indeed, the voluntary decision to adopt the new reporting system is not an exogenous event and might follow specific firm's characteristics (in terms of higher incentives for transparency), thereby biasing the sample-building process (Christensen et al., 2015; Jin et al., 2015; Ahmed et al., 2013; Daske et al., 2008). Bearing in mind, this study constrains such possible distortion by selecting the R/E sample implying a matched case-control design, in order to obtain two samples (R/E and A/L) that consist of firms with the same profiles and, therefore, the same incentives toward financial reporting quality and transparency⁹⁵.

Finally, the survivorship bias occurs when only firms persisting over time are included in the sample, threatening to analyze only the bests. In this study, such a risk is limited by examining a relatively short window period (from 2001 to 2015), rather than developing a long time-series analysis to capture the impact of the documented shift from a revenue/expense model to an asset/liability one over some accounting attributes (Bartov et al., 2000; Ecker et al., 2006). Therefore,

⁹⁴ The relationship becomes inverse when they consider earnings management instead of earnings quality.

⁹⁵ See the next paragraph (2.3).

such a research strategy enables to mitigate the risk that a worsening in the fundamentals and the quality of accounting could not be due to the evolution in the reporting system but rather to substantial changes within the organizations and in the macroeconomic environment (Singer and You, 2011; Srivastava, 2014).

2.3 Sample selection

Relaying on the methodological issues described in the previous paragraph, the sample consists of Italian private non-financial firms with available data from 2001 to 2015. Moreover two more conditions has to be met: in order to be included in the sample, the companies had to be limited liability ones and had not to be involved in a liquidation process.

The database used for sampling is AIDA, provided by Bureau Van Dijk and, starting from the set of general parameters, two sub-sample has been identified.

The first group consists of private Italian companies that voluntarily adopt the IAS/IFRS reporting system (A/L firms). Specifically, this sample is characterized by higher incentives towards transparency and by an accounting model closer to an asset/liability approach. After excluding firms whose financial and corporate governance data were not available, the basic sample is composed of 118 units, from which a final sample of 1,749 firm-year observations is obtained.

Table 1 – Sample selection process of A/L firms

Population of Italian private voluntary IAS/IFRS adopters	137
Firms with accounting and corporate governance data not available	- 19
Basic A/L sample	118

In addition, a second sample (R/E group) of Italian private companies, that do not implemented IAS/IFRS and still adopt Italian GAAP, is randomly drew. Specifically, R/E firms adopt a revenue/expense financial reporting model but could be characterized by a lower incentive toward transparency. Therefore, in order to prove that the true determinants of the matching process effectiveness and, in turn, of the quality of earnings, are the variables considered in the following analysis, this study adopts a matched case-control design, where each firm is coupled to a control one, relaying on variables which are presumed to be associated with the analyzed outcome. Since A/L firms and R/E ones were similar with respect to variables coupling, their difference against the phenomenon analyzed is due to other factors not considered for linking the units of the two samples (Schlesselman, 1982). The idea behind this approach is to systematically compare A/L firms with other ones that are as similar as possible, except that they are not adopting the same financial reporting system (R/E firms). Specifically, for the purpose of this study, the R/E sample consists of firms with the same profiles of L/A ones, in terms of geographical and institutional context, industry (as proxied by the four-digit statistical classification of economic activities in the European Community – NACE, Rev. 2), size (as proxied by the amount of annual revenues), profitability (as proxied by ROA), and leverage. Therefore, this approach allowed to neutralize the most important factors that can affect the matching process effectiveness and the quality of earnings, outside of the main determinants of this study.

Moreover, after the determination of such parameters, the sampling process goes through those comparable firms showing in AIDA approximately the same

number of years (AIDA does not cover the same period of observation for all firms) and available accounting and governance variables. Finally, some potentially comparable firms showed in AIDA were in default, so they could not be considered. As a result of such peculiar process, the R/E group consists of 118 firms, from which a final sample of 1.750 firm-year observation is obtained.

In order to prove the sampling process effectiveness, Table 2 shows the two-tailed t-tests on means that control for differences in firm size, ROA, and leverage⁹⁶.

Table 2 – Two-tiles *t*-tests for differences in sales, ROA, and leverage

Panel A: Sales <i>t</i>-test between A/L firms and R/E firms						
	Obs	Mean	StdErr	StdDev	[95% Conf. Interval]	
A/L firms	118	8.87e+07	9959435	1.08e+08	6.90e+07	1.08e+08
R/E firms	118	8.21e+07	9092124	9.88e+07	6.41e+07	1.00e+08
Combined	236	8.54e+07	6731825	1.03e+08	7.21e+07	9.87e+07
Difference		6622790	1.35e+07		-1.99e+07	3.32e+07
H_a: Difference != 0						
Pr (T > t) = 0.6238						
Panel B: ROA <i>t</i>-test between A/L firms and R/E firms						
	Obs	Mean	StdErr	StdDev	[95% Conf. Interval]	
A/L firms	118	0.0353023	0.0088697	0.0963494	0.0177363	0.0528682
R/E firms	118	0.0324217	0.0058303	0.0633336	0.0208750	0.0439684
Combined	236	0.0338620	0.0052967	0.0813694	0.0234269	0.0442971
Difference		0.0028806	0.0106143		-0.0180313	0.0237924
H_a: Difference != 0						
Pr (T > t) = 0.7863						

(continues)

⁹⁶ A Chi-square test to control for differences in the industry distribution has also been performed. For the sake of brevity, the results are not reported here but are available from the author.

Panel C: Leverage <i>t</i>-test between A/L firms and R/E firms						
	Obs	Mean	StdErr	StdDev	[95% Conf. Interval]	
A/L firms	118	0.5663066	0.0208554	0.2265480	0.5250035	0.6076097
R/E firms	118	0.5980692	0.0198938	0.2161023	0.5886705	0.6374679
Combined	236	0.5821879	0.0144176	0.2214878	0.5537836	0.6105922
Difference		-0.0317626	0.0288221		-0.0885465	0.0250214
H_a: Difference != 0						
Pr (T > t) = 0.2716						

Note: A/L firms are private companies that voluntarily opt for the IAS/IFRS adoption. R/E firms, instead, are private companies that still adopt the Italian GAAP and do not switch to the IAS/IFRS reporting system, even though this would have been possible for them.

3. Variables Definition and Research Methods

This section defines proxies for the degree of matching effectiveness, earnings quality attributes and other control variables, followed by the appropriate model specification to test the hypotheses.

3.1 Proxies and models for the degree of matching

The effectiveness of matching process is represented by the degree of contemporaneous association between revenues and expenses (*Matching*). Relying on Dichev and Tang (2008), *Matching* is computed by assessing the coefficients of a model that regress current operating revenues (*Rev*) on one-year-back, present, and one-year-forward operating expenses (*Exp*)⁹⁷:

$$Rev_{it} = \beta_0 + \beta_1 Exp_{i(t-1)} + \beta_2 Exp_{it} + \beta_3 Exp_{i(t+1)} + \varepsilon_{it} \quad (\text{Eq. 1})$$

where *i* and *t* represent, respectively, the firm and the year.

⁹⁷ All variables are deflated by average total assets between the values at the beginning and at the end of the year.

Eq. 1 is performed on a cross-sectional basis for each year of the reference period and separately for each of the two samples (A/L and R/E). In this model, the coefficient β_2 represents a proxy for the degree of matching (*Matching*), where higher values of β_2 are associated with a higher degree of matching and captures a stronger correlation between contemporaneous revenues and expenses. Once estimated the β coefficients for each year, a two-tailed t-test for differences in the means of β coefficients is used to compare the A/L and the R/E firms.

Given that Donelson et al. (2011) find supporting evidence for the influence of special items on the degree of matching, rather than the financial reporting system *per se*, this study is focused on operating revenues and expenses in order to better appreciate the specific role of accounting models on the analyzed issue.

However, it has to be pointed out that such a methodology does not allow to control for other firms' specific factors (such as industry, R&D activities, and volatility of both sales and operating cash flow) which, according to previous literature, might affect the degree of matching effectiveness, irrespective of the implemented reporting system (Srivastava, 2014; He and Shan, 2015).

For such a reason, this study goes in depth through a second step of analysis that require the definition of a new proxy for the degree of matching effectiveness (M°). Specifically, M° is defined as the standard deviation of the residuals obtained from the following heteroskedastic-robust standard errors panel data regression with fixed effects, performed for each sample (A/L and E/R):

$$Rev_{it} = \beta_0 + \beta_1 Exp_{i(t-1)} + \beta_2 Exp_{it} + \beta_3 Exp_{i(t+1)} + \sum (Year\ dummies)_{it} + \sum (Fixed\ effects)_{it} + \varepsilon_{it} \quad (Eq. 2)$$

where i represents the firm, and t stands for the year.

Bearing in mind that a higher standard deviation of the such residuals reflects a lower degree of matching between revenues and expenses, M° is used as dependent variable of the following cross-sectional robust regression model that include both samples (A/L and R/E):

$$M^\circ = \beta_0 + \beta_1(R/E) + \beta_2Size + \beta_3\sigma Sales + \beta_4\sigma OCF + \beta_5\mu ROA + \beta_6\mu Lev + \beta_7Own + \sum (Industry\ dummies) + \varepsilon \quad (\text{Eq. 3})$$

where R/E is a dummy variable which take the value of 1 for all firms that do not adopt the IAS/IFRS reporting system and still adopt the Italian GAAP. In particular, this variable allow to assess the relationship between the two different accounting models and the degree of matching effectiveness.

Further, in order to better test the first hypothesis (Hp1), in addition to the dummy variable related to the financial reporting system (R/E), the regression model also includes several control variables that might affect M° apart from the adopted accounting model and the firms' specific incentives. Specifically, following Francis et al. (2005), the model includes three innate determinants of the quality of accounting numbers and processes⁹⁸: the log-function of the average value of total annual sales as a proxy for firm size ($Size$), and the standard deviations of sales ($\sigma Sales$) and operating cash flows (σOCF), that represent proxies for uncertainty and volatility in the firms' operating environment. In addition a measure of the profitability of the firm (μROA), computed as the mean value of

⁹⁸ See Par. 3, Chapter 1.

the annual ratios between operating income and total assets, is also included to control for economic incentives⁹⁹.

Moreover, the model also includes two corporate governance variables. The first one is represented by the average value of financial leverage (μLev), computed as the mean of the annual ratios between net debt and total assets. The second one (Own) captures the ownership concentration and is computed as a categorical variable that assumes the following values: 1 in case of direct control higher than 0.5; 2 in case of indirect control higher than 0.5; 3 in case of ownership concentration between 0.5 and 0.25; 4 in case of ownership concentration lower than 0.25. Therefore, this means that the higher values of Own correspond to a lower ownership concentration of the observed firms.

The two empirical models discussed above are estimated only for the post IAS/IFRS adoption period. Specifically, for the A/L firms it corresponds to the years in which they have actually implemented the IAS/IFRS accounting model, while for the R/E firms it starts from the year in which they would have had the chance to change their accounting system, that is 2006.

Moreover, referring to the same period, the A/L group has been divided in two sub-samples in order to enrich the analysis and enhance the robustness of findings. Specifically, the A/L firms have been splitted in firms that are controlled by companies that adopt the IAS/IFRS reporting system, and others that are non controlled at all or are controlled by entities that do not adopt the IAS/IFRS model. Assuming that companies of the first group could have switched to IAS/IFRS mainly for complying with parent company requirements, it could be

⁹⁹ In connection with such variables, it is expected that M^o is positive related to both $Size$ and μROA , but negative related to both $\sigma Sales$ and σOCF .

possible that the two sub-samples have different incentives in terms of transparency and quality of financial reporting. Therefore, this study will also perform Eq. 3, only including A/L firms that, since not controlled by IAS/IFRS companies, should have higher incentives for a better financial reporting process, in order to further reduce the risk biased results.

However, in such settings a major concern is related to the possible pre-existing differences between A/L firms and R/E ones. In particular, if the two group of firms already had differences in terms of matching effectiveness it could be misleading to conclude that the an accounting model is better than the other one, based exclusively on the analysis of the post-switch period.

Therefore, in order to go around such an issue, this study also implements a difference-in-difference (D-I-D) analysis, which allow to assess whether the differences in the degree of matching effectiveness, between A/L and R/E firms, already exist when they all used Italian GAAP and how these differences change after the A/L firm switched to IAS/IFRS. In this way, the D-I-D model, coupled with the use of a matched case-control design during the sampling process, can further mitigate the risk that differences between the two analyzed samples are not due to different accounting models but to changes in the macroeconomic conditions.

In order to carry out this kind of analysis, the following cross-sectional robust regression model is estimated:

$$\begin{aligned}
 M^o = & \beta_0 + \beta_1(A/L) + \beta_2Post + \beta_3[(A/L)*Post] + \\
 & + \beta_4Size + \beta_5\sigma Sales + \beta_6\sigma OCF + \beta_7\mu ROA + \beta_8\mu Lev \\
 & + \beta_9Own + \beta_{10}Control + \sum (Industry\ dummies) + \varepsilon
 \end{aligned}
 \tag{Eq. 4}$$

where *A/L* is a dummy variable which take the value of 1 for all firms that opt for the implementation of the IAS/IFRS reporting system, *Post* is a dummy variable which take the value of 1 for the period that follow the change in the accounting model (for the A/L firms) or for the period in which the R/E firms would have had the chance to change their accounting system, and finally $(A/L)*Post$ is the interaction between the two aforementioned variables. In addition, beside the other variables already defined, *Control* is a dummy that take the value of 1 for all A/L firms controlled by other companies that adopt the IAS/IFRS model.

Note that, in this model, the interaction variable take the value of 1 only for A/L firms after they actually switched to IAS/IFRS, and captures the effect of the change in the reporting system on the degree of matching effectiveness in relation to possible the pre-existing differences between A/L firms and R/E ones.

3.2 Proxies and models for earnings attributes

The main attributes analyzed in this study as proxies for the quality of accounting numbers are: predictability, persistence, and volatility of operating income.

3.2.1 Predictability

The proxy for earnings predictability (*Pred*) is given by the square root of the error variance of the following fixed-effect regression model, separately performed for each of the two samples (Lipe, 1990)¹⁰⁰:

$$EBIT_{it} = \beta_0 + \beta_1 EBIT_{i(t-1)} + \sum (Year\ dummies)_{it} + \sum (Fixed\ effects)_{it} + \varepsilon_{it} \quad (Eq. 5)$$

¹⁰⁰ All variables are deflated by average total assets between the values at the beginning and at the end of the year.

where, i and t represent, respectively, the firm and the year.

The relationship between the two reporting systems (A/L and R/E) and the predictability of earnings is then assessed using the variable $Pred$ as a dependent variable of the cross-sectional robust regression expressed in Eq. 3, that becomes:

$$Pred = \beta_0 + \beta_1(R/E) + \beta_2Size + \beta_3\sigma Sales + \beta_4\sigma OCF + \quad (Eq. 6)^{101}$$

$$+ \beta_5\mu ROA + \beta_6\mu Lev + \beta_7Own + \sum (Industry\ dummies) + \varepsilon$$

The same reasoning, related to the possible bias due to the pre-existing differences between the two group of firms (A/L and R/E), could be also applied to the assessment of earnings predictability. Therefore a difference-in-differences analysis is proposed replacing the dependent variable of Eq. 4 with $Pred$:

$$Pred = \beta_0 + \beta_1(A/L) + \beta_2Post + \beta_3[(A/L)*Post] + \quad (Eq. 7)$$

$$+ \beta_4Size + \beta_5\sigma Sales + \beta_6\sigma OCF + \beta_7\mu ROA + \beta_8\mu Lev +$$

$$+ \beta_9Own + \beta_{10}Control + \sum (Industry\ dummies) + \varepsilon$$

Further, in order to directly assess the impact of changes in the degree of matching effectiveness on the predictability of earnings, Eq. 6 is rearranged in order to include the proxy M° , that is the standard deviation of the residuals obtained from Eq. 2.

$$Pred = \beta_0 + \beta_1M^\circ + \beta_2(R/E) + \beta_3Size + \beta_4\sigma Sales + \quad (Eq. 8)$$

$$+ \beta_5\sigma OCF + \beta_6\mu ROA + \beta_7\mu Lev + \beta_8Own +$$

$$+ \beta_8Control + \sum (Industry\ dummies) + \varepsilon$$

¹⁰¹ A positive relationship is expected between $Pred$ and both $Size$, and μROA , while a negative relationship is expected between $Pred$ and both $\sigma Sales$, and σOCF .

Bearing in mind that a higher value of M^o reflects a lower degree of matching between revenues and expenses, it has to be noted that a positive (negative) relationship between such variable and $Pred$ highlights that a lower degree of matching effectiveness negatively (positively) affect the predictability of earnings.

3.2.2 Persistence

The persistence of earnings associated with different financial reporting models (A/L and R/E) is detected through the slope coefficients of the following autoregressive fixed-effect regression model which relates current operating earnings and lagged operating earnings (Lev, 1983)¹⁰²:

$$\begin{aligned}
 EBIT_{it} = & \beta_0 + \beta_1 EBIT_{i(t-1)} + \beta_2 (R/E)_{it} + \\
 & + \beta_3 [(R/E) * EBIT_{i(t-1)}]_{it} + \beta_4 Size_{it} + \beta_5 \Delta Sales_{it} + \\
 & + \beta_6 \Delta OCF_{it} + \beta_7 \Delta ROA_{it} + \beta_8 Lev_{it} + \beta_9 Own_{it} + \\
 & + \sum (Year\ dummies)_{it} + \sum (Fixed\ effects)_{it} + \varepsilon_{it}
 \end{aligned}
 \tag{Eq. 9}$$

where β_3 is used as a proxy for the earnings persistence associated with the revenue/expense model (R/E firms) relative to the asset/liability one (A/L firms). In addition, the other control variables has the same functions described above, but they are used in their panel form. Therefore, $Size$ represents the log-function of annual sales; $\Delta Sales$, ΔOCF , and ΔROA are, respectively, the annual changes in sales, in operating cash flow, and in the firm profitability; Lev is computed as

¹⁰² All variables are deflated by average total assets between the values at the beginning and at the end of the year

the annual ratio between net debt and total assets; and finally *Own* is defined as described above for Eq. 3¹⁰³.

As regard to the issue related to the possible pre-existing differences in the analyzed phenomenon, the model proposed in Eq. 4 and Eq. 7 has to be modified in order to be adapted to the time series nature of the earnings persistence assessment. Specifically, Eq. 9 is enriched in order to take in account the interaction variables that allow to highlight a possible pre-existing difference and the net effect of the switch from a financial reporting model to another:

$$\begin{aligned}
 EBIT_{it} = & \beta_0 + \beta_1[(A/L)*EBIT_{i(t-1)}]_{it} + \beta_2 [Post*EBIT_{i(t-1)}]_{it} + \quad (Eq. 10) \\
 & + \beta_3[(A/L)*Post*EBIT_{i(t-1)}]_{it} + \beta_4Size_{it} + \beta_5\Delta Sales_{it} + \\
 & + \beta_6\Delta OCF_{it} + \beta_7\Delta ROA_{it} + \beta_8Lev_{it} + \beta_9Own_{it} + \beta_{10}Control_{it} + \\
 & + \sum (Year\ dummies)_{it} + \sum (Fixed\ effects)_{it} + \varepsilon_{it}
 \end{aligned}$$

The variables *A/L* and *Post* are defined as discussed above, and the coefficient of the triple interaction variable (β_3) remains the parameter that captures the effect of the change in the reporting system on the persistence of operating earnings in relation to possible the pre-existing differences between A/L firms and R/E ones.

Further, in order to directly assess the impact of changes in the degree of matching effectiveness on the persistence of earnings, Eq. 9 is modified in order to include a proxy that represents the level of correlation between contemporaneous revenues and expenses:

¹⁰³ A positive relationship is expected between $EBIT_{it}$ and both *Size*, and ΔROA , while a negative relationship is expected between $EBIT_{it}$ and both $\Delta Sales$, and ΔOCF .

$$\begin{aligned}
EBIT_{it} = & \beta_0 + \beta_1 EBIT_{i(t-1)} + \beta_2 PoorMatching_{it} + & (Eq. 11) \\
& + \beta_3 [PoorMatching_{it} * EBIT_{i(t-1)}]_{it} + \beta_4 Size_{it} + \\
& + \beta_5 \Delta Sales_{it} + \beta_6 \Delta OCF_{it} + \beta_7 \Delta ROA_{it} + \beta_8 Lev_{it} + \beta_9 Own_{it} + \\
& + \sum (Year\ dummies)_{it} + \sum (Fixed\ effects)_{it} + \varepsilon_{it}
\end{aligned}$$

The variable *PoorMatching* is a dummy variable that takes the value of 1 if the residuals from Eq. 2 for the firm *i* in the year *t* are above the median, and zero otherwise. Therefore, it has to be noted that higher values of *PoorMatching* are associated with a lower degree of matching effectiveness. Moreover, *PoorMatching_{it} * EBIT_{i(t-1)}* is an interaction variable that captures the level of earnings persistence of firms with lower degree of matching between contemporaneous revenues and expenses.

3.2.3 Volatility

The proxy for earnings volatility (*Vol*) is represented by the ratio between the standard deviation of EBIT and the standard deviation of operating cash flow (Burgstahler et al., 2008). In such a way, higher values of this ratio correspond to a higher volatility of operating income.

This measure of earning volatility is then used as the dependent variable of a cross-sectional robust regression model (obtained by replacing the response variable in Eq. 3, as well as in Eq. 6) in order to examine the impact of different financial reporting systems on earnings volatility, after controlling for the innate determinants of earnings quality and for the potential impact of corporate governance and industries:

$$Vol = \beta_0 + \beta_1(R/E) + \beta_2Size + \beta_3\sigma Sales + \beta_4\mu ROA + \quad (Eq. 12)^{104}$$

$$+ \beta_5\mu Lev + \beta_6Own + \sum (Industry\ dummies) + \varepsilon$$

Note that, beside the replacement of the dependent variable, it has been also written off the standard deviation of operating cash flow in order to avoid a multicollinearity problem, since σOCF has been used in the definition of the dependent variable. Therefore, the model already embody the effect of the operating cash flow volatility.

Again, as seen in connection with previous models, also for the volatility of operating earnings is proposed a difference-in-differences analysis for the same reasons discussed above. Specifically, the D-I-D model is obtained by replacing the dependent variable of Eq. 4 (as well as Eq. 7), with the variable Vol , and simultaneously excluding σOCF for the aforementioned reason:

$$Vol = \beta_0 + \beta_1(A/L) + \beta_2Post + \beta_3[(A/L)*Post] + \quad (Eq. 13)$$

$$+ \beta_4Size + \beta_5\sigma Sales + \beta_6\mu ROA + \beta_7\mu Lev$$

$$+ \beta_8Own + \beta_9Control + \sum (Industry\ dummies) + \varepsilon$$

Further, in order to directly assess the impact of changes in the degree of matching effectiveness on the volatility of earnings, Eq. 12 is enriched to include the proxy M° , that is the standard deviation of the residuals obtained from Eq. 2:

$$Vol = \beta_0 + \beta_1M^\circ + \beta_2(R/E) + \beta_3Size + \beta_4\sigma Sales + \quad (Eq. 14)$$

$$+ \beta_5\sigma OCF + \beta_6\mu ROA + \beta_7\mu Lev + \beta_8Own +$$

$$+ \beta_9Control + \sum (Industry\ dummies) + \varepsilon$$

¹⁰⁴ In this case, it is expected a negative relationship between Vol and both $Size$, and μROA , and a positive relationship between Vol and both $\sigma Sale$, and σOCF .

Bearing in mind that a higher value of M^o reflects a lower degree of matching between revenues and expenses, it has to be noted that a positive (negative) relationship between such variable and Vol highlights that a lower degree of matching effectiveness negatively (positively) affect the predictability of earnings.

4. Empirical findings

This section provides a description of the main results from the descriptive and univariate correlation analysis of the variable that are, then, included in the multivariate investigation. In connection with the latter, this section also discusses all findings from the empirical models, as discussed in the previous paragraph, in order to test the two hypotheses proposed in this chapter.

4.1 Descriptive statistics and preliminary tests

Tables 3 shows descriptive statistics for the continuous variables involved.

As expected after the matched case-control design for the sampling process, descriptive statistics highlight no great differences between L/A firms and R/E one in terms of economic fundamentals.

However, beside the two group of firms have a similar profile in term of economic fundamentals, it can be noted that they have some differences when the mean values of proxies for the degree of matching effectiveness and for the quality of earnings are compared. Specifically, Table 3 highlights that while the two sub-samples have almost the same average earnings predictability, the R/E firms have a lower volatility of earnings than A/L ones. Moreover, both proxies for the degree of matching effectiveness are better for firms adopting a revenue/expense reporting system.

Table 3 – Descriptive statistics – 2006/2015

Panel A: descriptive statistics for L/A firms					
Variable	Min	Max	Mean	Median	ST-Dev
<i>Revenues</i>	0.00716	2.35041	0.64577	0.56283	0.47637
<i>Expenses</i>	0.03485	2.68880	0.65696	0.57054	0.50297
<i>EBIT</i>	-0.45089	0.25940	0.02271	0.02655	0.09931
<i>OCF</i>	-0.65789	0.79473	0.05105	0.04967	0.10217
<i>Size</i>	14.4669	19.8828	17.5907	17.6553	1.27769
σ_{Sales}	0.00172	0.84672	0.15057	0.09844	0.15830
σ_{OCF}	0.00482	0.22492	0.05266	0.03680	0.05273
μ_{Lev}	0.03271	0.95992	0.57101	0.60997	0.21103
<i>Matching</i>	0.45470	1.13742	0.84782	0.87638	0.19010
M°	0.00171	0.36790	0.06434	0.04776	0.06645
<i>Pred</i>	0.00752	0.19974	0.04828	0.03423	0.04135
<i>Vol</i>	0.10118	11.7004	1.38916	1.20094	1.27640
Panel B: descriptive statistics for R/E firms					
Variable	Min	Max	Mean	Median	ST-Dev
<i>Revenues</i>	0.00989	2.21307	0.75472	0.57419	0.70129
<i>Expenses</i>	0.05582	2.30190	0.73984	0.53304	0.60308
<i>EBIT</i>	-0.38158	0.26594	0.02846	0.03929	0.06712
<i>OCF</i>	-0.52060	0.69803	0.06761	0.05742	0.09622
<i>Size</i>	15.2564	20.3365	17.9686	18.0600	1.30031
σ_{Sales}	0.00277	0.86732	0.18834	0.11646	0.17537
σ_{OCF}	0.00602	0.21026	0.04834	0.03002	0.03216
μ_{Lev}	0.07513	0.91752	0.59046	0.61808	0.17962
<i>Matching</i>	0.89548	1.07733	0.99188	0.99289	0.06038
M°	0.01098	0.21157	0.05272	0.03482	0.04226
<i>Pred</i>	0.00850	0.13523	0.03530	0.02839	0.02528
<i>Vol</i>	0.12511	4.76784	1.24384	1.21726	0.68642

Note: all economic fundamental variables are scaled by total assets. For a detailed definition of the variables, please refer to paragraph 3 of this chapter.

Given that the variable *Matching* (β_2 in Eq. 1) captures degree of contemporaneous association between revenues and expenses, and that Table 3 shows an important difference between A/L firms and R/E ones, a statistical comparison between the two sub-samples involved in this study represents the first step of analysis. Therefore, a two-tailed t-test for differences in the means of the variable *Matching* and of the other β coefficients obtained from Eq. 1 is used to compare A/L and the R/E firms (results are reported in the following Table 4). Panel B of Table 4 highlights that there is a statistically significant difference between the *Matching* coefficient of the two sub-samples, with R/E firms that have a higher β_2 coefficient, implying a higher degree of matching between contemporaneous revenues and expenses, relative to L/A firms, during the period that follow the IAS/IFRS introduction. Moreover, a two-tailed *t*-tests for differences in *Matching* has been also performed for the pre-2006 period, when both R/E and L/A firms adopted the Italian GAAP. Findings from this additional tests reveal that there were no statistically significant differences between the two sub-sample¹⁰⁵.

In addition, particularly interesting is the evidence highlighted in Panel C of Table 4. Specifically, it results that a L/A firms have a higher correlation between current revenues and one-year-forward expenses, relative to R/E firms. Therefore, it seems that firms adopting an asset/liability reporting system tend to anticipate the recognition of such revenues relative to the related expenses. However, such an issue requires specific analyses and further investigation in order to be interpreted in the proper way.

¹⁰⁵ For the sake of brevity, results are not reported here but are available from the author.

Table 4 – Two-tiles t -tests for differences in $Matching(\beta_2$ in Eq. 1) – 2006/2015

Panel A: β_1 t-test between L/A firms and R/E firms						
	Obs	Mean	StdErr	StdDev	[95% Conf. Interval]	
L/A firms	9	0.0201814	0.0437779	0.1313337	-0.0807707	0.1211334
R/E firms	9	0.0248467	0.0123703	0.0371109	-0.0036793	0.0533727
Combined	18	0.0225141	0.0220742	0.0936527	-0.0240583	0.0690864
Difference		-0.0046654	0.0454921		-0.1011043	0.0917735
H _a : Difference != 0						
Pr (T > t) = 0.9196						
Panel B: β_2 t-test between L/A firms and R/E firms						
	Obs	Mean	StdErr	StdDev	[95% Conf. Interval]	
L/A firms	9	0.8478208	0.0633660	0.1900980	0.7016986	0.9939431
R/E firms	9	0.9918831	0.0201281	0.0603844	0.9454675	1.0382990
Combined	18	0.9198519	0.0366783	0.1556128	0.8424675	0.9972364
Difference		-0.1440622	0.0664860		-0.2850063	-0.0031182
H _a : Difference < 0						
Pr (T < t) = 0.0228						
Panel C: β_3 t-test between L/A firms and R/E firms						
	Obs	Mean	StdErr	StdDev	[95% Conf. Interval]	
L/A firms	9	0.0723054	0.0416929	0.1250787	-0.0238386	0.1684494
R/E firms	9	-0.0277187	0.0131304	0.0393911	-0.0579974	0.0025599
Combined	18	0.0222933	0.0244276	0.1036375	-0.0292444	0.0738310
Difference		0.1000241	0.0437116		0.0073597	0.1926885
H _a : Difference > 0						
Pr (T > t) = 0.0180						

Note: A/L firms are private companies that voluntarily opt for the IAS/IFRS adoption. R/E firms, instead, are private companies that still adopt the Italian GAAP and do not switch to the IAS/IFRS reporting system, even though this would have been possible for them.

4.2 Univariate correlations matrix

Table 5 reports the univariate correlations matrix for all variables, except those included in Eq. 1, Eq. 2, and in equations from 9 to 11.

In particular, the dummy variable (R/E) is negatively related to M^o , $Pred$, and Vol , implying that firms adopting a revenue expenses reporting system (Italian GAAP) should have a low level of volatility of earnings and a high level of both degree of matching process effectiveness and earnings predictability. On the other hand, as a mirror image, the dummy variable (A/L) has exactly opposite relationships.

Moreover, it has to be noted that M^o is positively correlated with $Pred$, and has a negative, even if not significant, relationship with Vol . This means that, as a preliminary evidence, a higher degree of matching effectiveness positively affects the quality of earnings in terms of predictability and volatility.

As for the control variables, $Size$ is negatively related with M^o , implying that bigger firms has an higher level of matching between contemporaneous revenues and expenses. Moreover, $\sigma Sales$ and σOCF , as proxies for the volatility of the operating environment, negatively affect the degree of matching effectiveness and the quality of earnings in terms of predictability and volatility, as expected.

Such a relationships will be deepened in the multivariate analysis, presented in the next paragraph.

Table 5 – Pairwise correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) <i>M°</i>	1.0000											
(2) <i>Pred</i>	0.7423*	1.0000										
(3) <i>Vol</i>	-0.0727	0.0565	1.0000									
(4) <i>(A/L)</i>	0.1043*	0.1869*	0.2636*	1.0000								
(5) <i>(R/E)</i>	-0.1043*	-0.1869*	-0.2636*	-1.0000	1.0000							
(6) <i>Size</i>	-0.1293*	-0.0922	-0.0936	-0.1241*	0.1241*	1.0000						
(7) <i>σSales</i>	0.4585*	0.2082*	-0.2677*	-0.2914*	0.2914*	0.0737	1.0000					
(8) <i>σOCF</i>	0.5262*	0.5924*	0.0412	0.1384*	-0.1384*	-0.1057	0.2427*	1.0000				
(9) <i>μROA</i>	-0.1020*	-0.3163*	-0.0857	-0.1908*	0.1908*	0.1250*	-0.0072	-0.3417*	1.0000			
(10) <i>μLev</i>	0.0771	0.0620	-0.2099*	-0.0443	0.0443	0.1605*	0.1715*	-0.1197*	-0.2168*	1.0000		
(11) <i>Own</i>	-0.0723	-0.1356*	-0.1224*	-0.2800*	0.2800*	-0.1435*	0.0294	-0.0969	0.0371	-0.0184	1.0000	
(12) <i>Control</i>	0.0759	0.0979	0.0651	0.5708*	-0.5708*	0.0614	-0.1324*	0.0976	-0.0623	0.0166	-0.2683*	1.0000

Note: for a detailed definition of the variables included in the model, please refer to paragraph 3 of this chapter.

* Significance at the 0.10.

4.3 Multivariate regression models

4.3.1 Different accounting systems and degree of matching

In order to test the first hypothesis, according to which, all else equal in terms of reporting incentives, the switch from a revenue/expense model to an asset/liability approach negatively affects the degree of matching effectiveness, Eq. 3 is performed in order to compare the R/E firms with the A/L ones. In particular, Column 1 of Table 6 highlights the comparison between the whole two groups of firms, while Column 2 of Table 6 shows findings from Eq. 3 when the model is performed comparing R/E firms with the only A/L ones that are not controlled by companies which adopt the IAS/IFRS (as well as other asset/liability models).

Specifically, Column 1 of Table 6 shows a negative and strongly significant correlation between (R/E) and M^o ($P > |t| = 0.009$), highlighting that R/E firms has a lower standard deviation of residuals of the regression of operating revenues on one-year-back, present, and one-year-forward operating expenses, relative to A/L firms. Specifically, this means that, firms that still adopt Italian GAAP has an higher degree of marching effectiveness, relative to companies that opted for the IAS/IFRS implementation.

Moreover, M^o is positively influenced by σ_{Sales} and σ_{OCF} (both p-values are lower than 0.01), showing that a higher volatility in the operating environment (in terms of sales and operating cash flow) lowers the contemporaneous association between revenues and expenses.

Table 6 – Accounting systems and degree of matching effectiveness – 2006/2015

Dep. variable: <i>M</i> ^o	A/L vs. R/E			A/L (free of control) vs. R/E		
	Coefficient	<i>t</i> -stat	P > <i>t</i>	Coefficient	<i>t</i> -stat	P > <i>t</i>
Intercept	0.0918521	2.22	0.028	0.0957520	1.80	0.074
(<i>R/E</i>)	- 0.0165352	- 2.62	0.009	- 0.0163985	- 1.75	0.082
<i>Size</i>	- 0.0049072	- 1.99	0.047	- 0.0052112	- 1.63	0.105
<i>σSales</i>	0.1105311	3.86	0.000	0.1048092	3.12	0.002
<i>σOCF</i>	0.4999611	3.97	0.000	0.5632149	4.09	0.000
<i>μROA</i>	- 0.0001163	- 0.00	0.999	0.0671058	0.75	0.453
<i>μLev</i>	0.0227509	1.39	0.166	0.0287407	1.40	0.163
<i>Own</i>	- 0.0011161	- 0.38	0.754	- 0.0010891	- 0.36	0.719
Industry effects	Included			Included		
<i>R</i> ²	0.43360			0.41670		
Root MSE	0.04288			0.04269		
F-value	7.57			6.91		
Prob. >F	0.0000			0.0000		
No. of obs.	236			178		

Note: for a detailed definition of the variables included in the model, please refer to paragraph 3 of this chapter.

Note that, as shown in column 2 of Table 6, the same consideration can be proposed when the model considers only A/L firms that are not controlled by IAS/IFRS companies and, therefore, should have higher incentives for a better financial reporting process. Indeed, while the correlations between *M*^o and other control variables shall remain unchanged, the negative relationship between (*R/E*) and the response variable holds, even if it is not as strong as previously discussed ($P > |t| = 0.082$).

These results, combined with those reported in Table 4 discussed above¹⁰⁶, could already lead to accept the first hypothesis. However, such a conclusion could be misleading because of possible pre-existing differences in terms of matching effectiveness between firms that adopt a revenue/expense reporting system and firms that switched to an asset/liability model.

Therefore, this study also carries out a Difference-In-Differences analysis, performing Eq. 4, which allow to assess whether the detected differences in the degree of matching effectiveness, between A/L and R/E firms, already existed when they all used Italian GAAP and how these differences could have changed after the A/L firms switched to IAS/IFRS.

In particular, Table 7 shows that while there were no statistically significant differences between R/E firms and A/L ones ($P > |t| = 0.442$), when they both adopted a revenue/expense reporting system (Italian GAAP), such a difference, in terms of matching process effectiveness, becomes statistically significant when A/L firms opted for the implementation of the IAS/IFRS accounting model ($P > |t| = 0.008$). Specifically, as reported in the panel 'Post-switch' of Table 7, since the difference between the two coefficients of L/A and R/E firms is positive, it has to be noted that the D-I-D model confirms results from Eq. 3, that highlights a lower degree of matching effectiveness of A/L firms, relative to R/E ones, during the period after the change in the reporting system for A/L companies.

¹⁰⁶ See Par. 4.1 of this chapter.

Table 7 – Accounting systems and degree of matching effectiveness – 2001/2015

No. of observations	Pre-switch	Post- switch	TOT.	
L/A firms	118	118	236	$R^2 = 0.36$
R/E firms	118	118	236	
TOT.	236	236	472	
Outcome	M°	Std. Error	<i>t</i>-stat	$P > t$
Pre-switch				
<i>R/E firms</i>	0.067			
<i>L/A firms</i>	0.073			
Diff. (L/A – R/E)	0.005	0.007	0.77	0.442
Post- switch				
<i>R/E firms</i>	0.066			
<i>L/A firms</i>	0.085			
Diff. (L/A – R/E)	0.019	0.007	2.65	0.008
D-I-D (Post – Pre)	0.014	0.009	1.53	0.086

Note: for a detailed model specification and a definition of the variables included in the model, please refer to paragraph 3 of this chapter.

Finally, Table 7 also shows that the D-I-D coefficient (β_3 in Eq. 4) shows a positive and significant correlation with M° ($P > |t| = 0.086$), pointing out that, starting from a situation in which there were no differences in the degree of matching effectiveness between R/E and A/L firms (when they both adopted a revenue/expense reporting system), the choice of A/L firms to shift over an asset/liability accounting model represents a determinant of the observed worsening in the degree of matching effectiveness for such a group of firms.

Overall, the combining discussions of results from Eq. 3 and Eq. 4, and the two-tailed *t*-test on betas of Eq.1, lead to fully accept the first hypothesis and suggest that, all else equal especially in terms of reporting incentives, the switch from a

revenue/expense model to an asset/liability approach negatively affects the degree of matching between contemporaneous revenues and expenses.

4.3.2 Accounting systems, degree of matching, and earnings quality

This section discusses results obtained from the empirical models that highlights the impact of matching effectiveness on the quality of accounting numbers. Specifically, as discussed above, such a relationship is first indirectly tested, linking the discussion presented in the previous paragraph and findings from models which deepen the impact of different financial reporting systems on earnings quality. Then, in a second step of analysis, the relationship between the degree of matching effectiveness and the quality of earnings is directly tested thanks to adjusted models for earnings quality that include proxies for the degree of matching between contemporaneous revenues and expenses.

For each of the earnings quality attributes examined in this study, both analyses are presented in following paragraphs.

4.3.2.1 Predictability

As discussed above, Eq. 6 aims to compare the impact on earnings predictability of two different accounting systems.

Table 8 shows results from Eq. 6, when the model is performed only for the period after the effective adoption (for A/L firms) or the potential implementation (for R/E companies) of the IAS/IFRS financial reporting system. Specifically, Column 1 of Table 8 highlights the comparison between the whole two groups of firms, while Column 2 of Table 8 shows findings from Eq. 6 when the model is

performed comparing R/E firms with the only A/L ones that are not controlled by companies which adopt the IAS/IFRS reporting system.

Table 8 – Accounting systems and earnings predictability – 2006/2015

Dep. variable: <i>Pred</i>	A/L vs. R/E			A/L (free of control) vs. R/E		
	Coefficient	t-stat	P > t	Coefficient	t-stat	P > t
Intercept	0.0364563	1.46	0.146	0.0556142	1.88	0.062
(R/E)	- 0.0064787	- 1.98	0.049	- 0.0095193	- 2.00	0.047
<i>Size</i>	- 0.0017302	- 1.22	0.224	- 0.0030481	- 1.81	0.072
σ_{Sales}	0.0163958	1.72	0.087	0.0196288	2.04	0.042
σ_{OCF}	0.4137154	5.62	0.000	0.4941364	5.89	0.000
μ_{ROA}	- 0.0437688	- 1.01	0.316	0.0311209	0.52	0.604
μ_{Lev}	0.0137447	1.11	0.270	0.0216151	1.41	0.160
<i>Own</i>	- 0.0038882	- 2.51	0.013	- 0.0036761	- 2.15	0.003
Industry effects	Included			Included		
R^2	0.39780			0.43460		
Root MSE	0.02755			0.02656		
F-value	10.06			10.44		
Prob. >F	0.0000			0.0000		
No. of obs.	236			178		

Note: for a detailed definition of the variables included in the model, please refer to paragraph 3 of this chapter.

Column 1 of Table 8 shows a negative and significant correlation between *(R/E)* and *Pred* ($P > |t| = 0.049$), highlighting that R/E firms has a lower standard deviation of residuals of the regression of current EBIT on one-year-back EBIT, relative to A/L firms. Specifically, this means that, firms that still adopt Italian GAAP has an higher level of earnings predictability, relative to companies that opted for the IAS/IFRS implementation.

Moreover, *Pred* is positively influenced by σ_{Sales} and σ_{OCF} (p-values are, respectively, lower than 0.1 and 0.01), showing that a higher volatility in the

operating environment (in terms of sales and operating cash flow) reduces the predictability of earnings.

In addition, such a results are absolutely confirmed when the model considers only A/L firms that are not controlled by IAS/IFRS companies, with the correlation between *Pred* and (*R/E*) that is almost nearly identical in terms of coefficient and statistical significance ($P > |t| = 0.047$).

Relying on the reported results, therefore, it can be noted that, during the post-switch period, firms adopting a revenue/expense reporting system (Italian GAAP) have a higher earnings predictability than companies adopting an asset/liability approach (IAS/IFRS). However, also in this case, such a conclusion could be misleading because of possible pre-existing differences in terms of earnings predictability between firms that adopt a revenue/expense reporting system and firms that switched to an asset/liability model. Therefore, this study also carries out a D-I-D analysis, performing Eq. 7, which allows to assess whether the detected differences in the level of earnings predictability, between A/L and R/E firms, already existed when they all used the Italian GAAP and how these differences could have changed after the A/L firm switched to IAS/IFRS.

Table 9 shows that while there were no statistically significant differences between R/E firms and A/L ones ($P > |t| = 0.458$), when they both adopted a revenue/expense reporting system (Italian GAAP), such a difference, in terms of earnings predictability, becomes statistically significant when A/L firms opted for the implementation of the IAS/IFRS accounting model ($P > |t| = 0.003$). In particular, has reported in the panel 'Post-switch' of Table 9, since the difference between the two coefficients of L/A and R/E firms is positive, it has to be noted

that the D-I-D model confirms results from Eq. 6, that highlights a lower earnings predictability of A/L firms, relative to R/E ones, during the period after the change in the reporting system for A/L companies.

Table 9 – Accounting systems and earnings predictability – 2001/2015

No. of observations	Pre-switch	Post- switch	TOT.	R² = 0.38
L/A firms	118	118	236	
R/E firms	118	118	236	
TOT.	236	236	472	
Outcome	Pred	Std. Error	t-stat	P > t
Pre-switch				
<i>R/E firms</i>	0.039			
<i>L/A firms</i>	0.042			
Diff. (L/A – R/E)	0.003	0.004	0.74	0.458
Post- switch				
<i>R/E firms</i>	0.040			
<i>L/A firms</i>	0.053			
Diff. (L/A – R/E)	0.013	0.004	2.96	0.003
D-I-D (Post – Pre)	0.010	0.005	1.80	0.073

Note: for a detailed model specification and a definition of the variables included in the model, please refer to paragraph 3 of this chapter.

Moreover, Table 9 also shows that the D-I-D coefficient (β_3 in Eq. 7) highlights a positive and significant correlation with *Pred* ($P > |t| = 0.073$), pointing out that, starting from a situation in which there were no differences in the level of earnings predictability between R/E and A/L firms (when they both adopted a revenue/expense reporting system), the choice of A/L firms to shift over an asset/liability accounting model lowered the predictability of earnings for such a group of firms.

According to the deductive methodology that indirectly ties the degree of matching effectiveness to the predictability of earnings, given that the switch from a revenue/expense model to an asset/liability approach negatively affects the degree of matching effectiveness, and relaying on the assumption according to which the matching principle is not a mere earnings quality attribute but rather a ground rule of accrual accounting and, therefore, a determinant of the quality of earnings, the documented lowering of earnings predictability, after the change in the reporting system for A/L firms, could be indirectly influenced by the contemporaneous lowering in the degree of matching effectiveness.

However, it has to be noted that such a conclusion remains a deductive idea which can lead to biased conclusion inasmuch changes in accounting systems can influence both the quality of accounting numbers and the degree of matching effectiveness without a direct empirical correlation between matching and earnings quality. Therefore, Eq. 8 is performed in order to directly assess the impact of changing in matching effectiveness on earnings predictability.

Table 10 shows a positive and significant relationship between M^o and $Pred$ ($P > |t| = 0.000$) which implies a direct correlation between the degree of matching effectiveness and the predictability of earnings. Moreover, it has to be noted that, although the relationship between $Pred$ and (R/E) remains negative (as shown in Table 8), it becomes no longer significant. Specifically, this means that the observed lowering in the predictability of earnings originated by the asset/liability model is not merely due to a change in the accounting system, but it is primarily due to a worsening in the degree of matching effectiveness that, in turn, is directly

affected by the switch from a revenue/expense reporting system to an asset/liability approach.

Table 10 – Matching and earnings predictability – 2006/2015

Dep. variable: <i>Pred</i>	Coefficient	<i>t</i> -stat	P > <i>t</i>
Intercept	- 0.0047471	- 0.25	0.802
<i>M</i>^o	0.4061767	6.80	0.000
<i>(R/E)</i>	- 0.0005837	- 0.22	0.826
<i>Size</i>	0.0005293	0.48	0.633
<i>σSales</i>	- 0.0274248	- 3.15	0.002
<i>σOCF</i>	0.2086306	3.31	0.001
<i>μROA</i>	- 0.0538007	- 1.81	0.072
<i>μLev</i>	0.0050961	0.58	0.563
<i>Own</i>	- 0.0022560	- 2.08	0.038
<i>Control</i>	- 0.0038197	- 0.83	0.407
Industry effects	Included		
<i>R</i> ²	0.64610		
Root MSE	0.02112		
<i>F</i> -value	31.49		
Prob. > <i>F</i>	0.0000		
No. of obs.	236		

Note: for a detailed definition of the variables included in the model, please refer to paragraph 3 of this chapter.

4.3.2.2 *Persistence*

The persistence of earnings associated with different financial reporting models is detected through the β_3 coefficient of Eq. 9.

Table 11 shows results from Eq. 9, when the model is performed only for the period after the effective adoption (for A/L firms) or the potential implementation (for R/E companies) of the IAS/IFRS financial reporting system. Specifically,

Column 1 of Table 11 highlights the comparison between the whole two groups of firms, while Column 2 of Table 11 shows findings from Eq. 9 when the model is performed comparing R/E firms with the only A/L ones that are not controlled by companies which adopt the IAS/IFRS reporting system.

Table 11 – Accounting systems and earnings predictability – 2006/2015

Dep. variable: <i>EBIT_t</i>	A/L vs. R/E			A/L (free of control) vs. R/E		
	Coefficient	<i>t</i> -stat	P > <i>t</i>	Coefficient	<i>t</i> -stat	P > <i>t</i>
Intercept	- 0.3127482	- 4.22	0.000	- 0.3038867	- 3.88	0.000
<i>EBIT_(t-1)</i>	0.2328246	4.92	0.000	0.2492435	3.33	0.001
(<i>R/E</i>)	0.0007885	0.20	0.842	- 0.0028310	- 0.71	0.480
(<i>R/E</i>)*<i>EBIT_(t-1)</i>	0.2007189	3.04	0.003	0.2007249	2.32	0.022
<i>Size</i>	0.0220100	4.96	0.000	0.0206617	4.26	0.426
<i>ΔSales</i>	0.0029902	0.66	0.510	0.0040924	0.80	0.000
<i>ΔOCF</i>	0.0024908	3.37	0.001	0.0036663	3.58	0.000
<i>ΔROA</i>	0.0051023	6.35	0.000	0.0051638	5.89	0.000
<i>Lev</i>	- 0.0953101	- 4.28	0.000	- 0.0769527	- 3.31	0.001
<i>Own</i>	- 0.0002779	- 0.24	0.813	- 0.0002090	- 0.16	0.872
Year effects	Included			Included		
Industry effects	Included			Included		
<i>R</i> ² within	0.30210			0.34240		
<i>R</i> ² between	0.52660			0.54140		
<i>R</i> ² overall	0.37870			0.44690		
<i>F</i> -value	19.33			20.59		
Prob. > <i>F</i>	0.0000			0.0000		
No. of obs.	1950			1514		
No. of groups	236			236		

Note: for a detailed definition of the variables included in the model, please refer to paragraph 3 of this chapter.

Column 1 of Table 11 shows a positive and significant correlation between (*R/E*)**EBIT_(t-1)* and *EBIT_t* ($P > |t| = 0.003$), highlighting that R/E firms has a higher correlation between current and year-back EBIT, relative to A/L firms.

Specifically, this means that, firms that still adopt Italian GAAP has an higher level of earnings persistence, relative to companies that opted for the IAS/IFRS.

In addition, such a results are absolutely confirmed when the model consider only A/L firms that are not controlled by IAS/IFRS companies, with the correlation between $EBIT_t$ and $(R/E)*EBIT_{(t-1)}$ that still remains positive and statistically significant ($P > |t| = 0.022$).

Relying on the reported results, therefore, it can be noted that, during the post-switch period, firms adopting a revenue/expense reporting system (Italian GAAP) have a higher persistence of earnings than companies adopting an asset/liability approach (IAS/IFRS). However, also in this case, such a conclusion could be misleading because of possible pre-existing differences in terms of earnings persistence between firms that adopt a revenue/expense reporting system and firms that switched to an asset/liability model. Therefore, this study also carries out a D-I-D analysis, performing Eq. 10, which allow to assess whether the detected differences in the level of earnings persistence, between A/L and R/E firms, already existed when they all used Italian GAAP and how these differences could have changed after the A/L firm switched to IAS/IFRS.

Since the peculiarity of the persistence model that need a time series data analysis, the representation of results is different from previous D-I-D analyses.

In particular, Table 12 shows that the positive and significant correlations between $EBIT_t$ and both $(A/L)*EBIT_{(t-1)}$ and $Post*EBIT_{(t-1)}$ (both p-values are lower than 0.01) highlights that, over the reference period, there has been an increasing in the persistence of earnings for A/L firms both in general and after the implementation of the IAS/IFRS reporting system.

Table 12 – Accounting systems and earnings persistence – 2001/2015

Dep. variable: <i>EBIT_t</i>	Coefficient	<i>t</i> -stat	P > t
Intercept	- 0.1837874	- 5.66	0.000
<i>(A/L)*EBIT_(t-1)</i>	0.5274841	22.80	0.000
<i>Post*EBIT_(t-1)</i>	0.3377387	11.48	0.000
<i>(A/L)*Post*EBIT_(t-1)</i>	- 0.4752111	- 11.82	0.000
<i>Size</i>	0.0155905	8.20	0.000
<i>ΔSales</i>	- 0.0008388	- 0.89	0.373
<i>ΔOCF</i>	0.0008151	3.14	0.002
<i>ΔROA</i>	0.0054431	18.94	0.000
<i>Lev</i>	- 0.0873813	- 9.78	0.000
<i>Own</i>	0.0026866	0.92	0.359
<i>Control</i>	- 0.0083190	- 1.69	0.092
Year effects	Included		
Industry effects	Included		
<i>R</i> ² within	0.38610		
<i>R</i> ² between	0.52270		
<i>R</i> ² overall	0.44180		
<i>F</i> -value	77.88		
Prob. > <i>F</i>	0.0000		
No. of obs.	2857		
No. of groups	236		

Note: for a detailed model specification and a definition of the variables included in the model, please refer to paragraph 3 of this chapter.

However, Table 12 also shows that the D-I-D coefficient (β_3 in Eq. 10) highlights a negative and strongly significant correlation with $EBIT_t$ ($P > |t| = 0.000$), pointing out that, the choice of A/L firms to shift over an asset/liability accounting model (through the IAS/IFRS adoption) negatively acts on the persistence of earnings for such a group of firms, when compared with R/E companies that still adopt a revenue/expense model (Italian GAAP).

According to the deductive methodology that indirectly ties the degree of matching effectiveness to the persistence of earnings, given that the switch from a revenue/expense model to an asset/liability approach negatively affects the degree of matching, and relaying on the assumption according to which the matching principle is not a mere earnings quality attribute but rather a ground rule of accrual accounting, the documented lowering of earnings persistence, that follows the change in the reporting system for A/L firms, could be indirectly influenced by the contemporaneous lowering in the degree of matching effectiveness.

However, it has to be noted that such a conclusion remains a deductive idea which can lead to biased conclusion inasmuch changes in accounting systems can influence both the quality of accounting numbers and the degree of matching effectiveness without a direct empirical correlation between matching and earnings quality.

Therefore, Eq. 11 is performed in order to directly assess the impact of changing in matching effectiveness on earnings persistence.

Table 13 shows a negative and significant relationship between $EBIT_t$ and $PoorMatch*EBIT_{(t-1)}$ ($P > |t| = 0.068$) which implies a positive and direct correlation between the degree of matching effectiveness and the persistence of earnings. Moreover, it has to be noted that, the relationship between $EBIT_t$ and $PoorMatch$ (which is influenced by the accounting system implemented) is positive but no significant. Specifically, this means that the observed lowering in the persistence of earnings originated by the asset/liability model is not merely due to a change in the accounting system, but it is primarily due to a worsening in

the degree of matching effectiveness that, in turn, is directly affected by the switch from a revenue/expense reporting system to an asset/liability approach.

Table 13 – Matching and earnings persistence – 2006/2015

Dep. variable: $EBIT_t$	Coefficient	<i>t</i> -stat	P > <i>t</i>
Intercept	- 0.3939993	- 4.39	0.000
$EBIT_{(t-1)}$	0.2767630	5.89	0.000
<i>PoorMatch</i>	- 0.0013718	0.03	0.976
<i>PoorMatch*EBIT</i>_(t-1)	- 0.0216739	- 0.43	0.068
<i>Size</i>	0.0273698	5.04	0.000
$\Delta Sales$	0.0009030	0.19	0.853
ΔOCF	0.0027221	3.96	0.000
ΔROA	0.0049292	6.17	0.000
<i>Lev</i>	- 0.1116466	- 4.29	0.000
<i>Own</i>	0.0001922	0.15	0.880
<i>Control</i>	- 0.0049514	- 1.05	0.293
Year effects	Included		
Industry effects	Included		
R^2 within	0.28440		
R^2 between	0.34960		
R^2 overall	0.3146		
<i>F</i> -value	12.84		
Prob. > <i>F</i>	0.0000		
No. of obs.	1.716		
No. of groups	236		

Note: for a detailed definition of the variables included in the model, please refer to paragraph 3 of this chapter.

4.3.2.3 Volatility

As discussed above, Eq. 12 is performed in order to examine the impact of different financial reporting systems on earnings volatility.

Table 14 shows results from Eq. 12, when the model is performed only for the period after the effective adoption (for A/L firms) or the potential implementation (for R/E companies) of the IAS/IFRS financial reporting system. Specifically, Column 1 of Table 14 highlights the comparison between the whole two groups of firms, while Column 2 of Table 14 shows findings from Eq. 12 when the model is performed comparing R/E firms with the only A/L ones that are not controlled by companies which adopt the IAS/IFRS reporting system.

Table 14 – Accounting systems and earnings volatility – 2006/2015

Dep. variable: <i>Vol</i>	A/L vs. R/E			A/L (free of control) vs. R/E		
	Coefficient	<i>t</i> -stat	P > <i>t</i>	Coefficient	<i>t</i> -stat	P > <i>t</i>
Intercept	1.5071930	1.46	0.147	2.1710990	2.01	0.046
(<i>R/E</i>)	- 0.1000277	- 0.87	0.386	- 0.1555211	- 0.88	0.382
<i>Size</i>	- 0.0318463	- 0.66	0.507	- 0.0727020	- 1.35	0.178
σ_{Sales}	- 0.3418140	- 1.68	0.094	- 0.1788764	- 0.77	0.440
μ_{ROA}	0.1761979	0.15	0.882	0.6397781	0.37	0.711
μ_{Lev}	1.1687570	2.65	0.009	1.2930600	2.28	0.024
<i>Own</i>	- 0.0686404	- 1.24	0.215	- 0.0714326	- 1.11	0.271
Industry effects	Included			Included		
R^2	0.05800			0.06600		
Root MSE	1.01240			1.06020		
F-value	1.72			1.47		
Prob. >F	0.0000			0.0000		
No. of obs.	236			178		

Note: for a detailed definition of the variables included in the model, please refer to paragraph 3 of this chapter.

Column 1 of Table 14 shows a negative and but not significant correlation between (R/E) and Vol ($P > |t| = 0.386$), highlighting that there are no statistically significant differences in term of earnings volatility between firms that still adopt Italian GAAP and firms that opted for the IAS/IFRS model.

In addition, such a results are absolutely confirmed when the model considers only A/L firms that are not controlled by IAS/IFRS companies, with the correlation between Vol and (R/E) that is almost nearly identical in terms of coefficient and statistical significance ($P > |t| = 0.0382$).

Relying on the reported results, therefore, it can be noted that, during the post-switch period, firms adopting a revenue/expense reporting system (Italian GAAP) and companies adopting an asset/liability approach (IAS/IFRS) have no difference in terms of earnings volatility. However, as many times reported in previous paragraphs, such a conclusion could be misleading because of possible pre-existing differences in terms of earnings volatility between firms that adopt a revenue/expense reporting system and firms that switched to an asset/liability model. Therefore, this study also carries out a D-I-D analysis, performing Eq. 13, which allow to assess whether the same level of earnings volatility, between A/L and R/E firms, already existed when they all used Italian GAAP and, if not, how the starting point could have changed after the A/L firm switched to IAS/IFRS.

Table 15 shows that, although L/A firms have a lower coefficient than R/E ones, there were no statistically significant differences between the two group of companies ($P > |t| = 0.216$), when they both adopted a revenue/expense reporting system (Italian GAAP).

Such a difference, in terms of earnings volatility, still remains not statistically significant for the period after A/L firms opted for the implementation of the IAS/IFRS accounting model ($P > |t| = 0.136$). In particular, it has to be noted that the D-I-D model confirms results from Eq. 12, that highlights no statistically significant differences in term of earnings volatility between A/L firms and R/E ones, during the period after the change in the reporting system for A/L firms.

Table 15 – Accounting systems and earnings volatility – 2001/2015

No. of observations	Pre-switch	Post- switch	TOT.	
L/A firms	118	118	236	$R^2 = 0.26$
R/E firms	118	118	236	
TOT.	236	236	472	
Outcome	Vol	Std. Error	t-stat	$P > t $
Pre-switch				
<i>R/E firms</i>	1.308			
<i>L/A firms</i>	1.125			
Diff. (L/A – R/E)	- 0.182	0.147	- 1.24	0.216
Post- switch				
<i>R/E firms</i>	1.220			
<i>L/A firms</i>	1.446			
Diff. (L/A – R/E)	0.226	0.151	1.49	0.136
D-I-D (Post – Pre)	0.408	0.188	2.17	0.030

Note: for a detailed model specification and a definition of the variables included in the model, please refer to paragraph 3 of this chapter.

However, Table 15 also shows that the D-I-D coefficient (β_3 in Eq. 11) highlights a positive and significant correlation with *Vol* ($P > |t| = 0.030$). This means that, although there were no differences in the level of earnings volatility between R/E and A/L firms (when they both adopted a revenue/expense reporting system) and even if the differences between the two group of firms are non significant also

when the ‘post-switch’ period is considered *per se*, the choice of A/L firms to shift over an asset/liability accounting model increased the volatility of earnings for such a group of firms. In fact, looking at the coefficients, it can be noted that the difference in the ‘pre-switch’ period and in the ‘post-switch’ one are not statistically significant because the coefficients A/L and R/E firms are quite similar in both periods. However, it must be pointed out how the coefficient of A/L firms becomes higher than the R/E coefficient in the ‘post-switch’ period, while it was lower in the ‘pre-switch’ period. Specifically, this implies a higher difference for the A/L group and determines a significant D-I-D coefficient.

According to the deductive methodology that indirectly ties the degree of matching effectiveness to the volatility of earnings, given that the switch from a revenue/expense model to an asset/liability approach negatively affects the degree of matching effectiveness, and relaying on the assumption according to which the matching principle is not a mere earnings quality attribute but rather a ground rule of accrual accounting, the documented increasing of earnings volatility, after the change in the reporting system for A/L firms, could be indirectly influenced by the contemporaneous lowering in the degree of matching effectiveness.

However, it has to be noted that such a conclusion remains a deductive idea which can lead to biased conclusion inasmuch changes in accounting systems can influence both the quality of accounting numbers and the degree of matching effectiveness without a direct empirical correlation between matching and earnings quality. Therefore, Eq. 14 is performed in order to directly assess the impact of changing in matching effectiveness on earnings predictability.

Table 16 – Matching and earnings persistence – 2006/2015

Dep. variable: <i>Vol</i>	Coefficient	<i>t</i>-stat	P > <i>t</i>
Intercept	0.7591754	0.77	0.440
<i>M</i>^o	5.5018350	2.29	0.023
<i>(R/E)</i>	- 0.0304769	- 0.19	0.849
<i>Size</i>	0.0039913	0.10	0.922
<i>σSales</i>	- 1.1159560	- 2.51	0.013
<i>μROA</i>	0.7166496	0.74	0.459
<i>μLev</i>	1.2076510	2.84	0.005
<i>Own</i>	- 0.0393769	- 0.81	0.417
<i>Control</i>	- 0.0922260	- 0.57	0.568
Industry fixed effects	Included		
<i>R</i> ²	0.12290		
Root MSE	0.97688		
<i>F</i> -value	2.72		
Prob. > <i>F</i>	0.0000		
No. of Observations	236		

Note: for a detailed definition of the variables included in the model, please refer to paragraph 3 of this chapter.

Table 16 shows a positive and significant relationship between *M*^o and *Vol* (*P* > |*t*| = 0.000) which implies a direct correlation between the degree of matching effectiveness and the volatility of earnings. Moreover, it has to be noted that the relationship between *Vol* and *(R/E)* remains negative and not significant (as shown in Table 14). Specifically, this means that the observed lowering in the volatility of earnings originated by the asset/liability model is not merely due to a change in the accounting system, but it is primarily due to a worsening in the degree of matching effectiveness that, in turn, is directly affected by the switch from a revenue/expense reporting system to an asset/liability one.

4.3.2.4 Summary

Relaying on the discussion of findings obtained from previous empirical models, the preliminary evidence suggests that, after controlling for several factors that might affect the quality of earnings, firms adopting the revenue/expense accounting system (R/E) provides better accounting numbers than firms reporting under an asset/liability model (A/L), in terms of predictability, persistence, and volatility of earnings.

Therefore, in order to test the second hypothesis aimed to assess if changes in matching effectiveness are systematically related to the quality of accounting numbers, such preliminary findings are linked with previous results related to the first hypothesis. Specifically, according to the deductive methodology that indirectly ties the degree of matching effectiveness to the volatility of earnings, given that the switch from a revenue/expense model to an asset/liability approach negatively affects the quality of accounting numbers (in terms of predictability, persistence, and volatility of earnings), and relaying on the assumption according to which the matching principle is not a mere earnings quality attribute but rather a ground rule of accrual accounting, the documented worsening in the quality of earnings, after the change of the reporting system for A/L firms, could be indirectly influenced by the contemporaneous lowering in the degree of matching effectiveness due to the IAS/IFRS adoption.

However, as widely discussed above, it has to be noted that such a conclusion remains a deductive idea which can lead to misleading conclusion inasmuch changes in accounting systems can influence both the quality of accounting numbers and the degree of matching effectiveness without a direct empirical

correlation between matching and earnings quality. Therefore, in a second step of analysis, the relationship between the degree of matching effectiveness and the quality of earnings is directly tested thanks to adjusted models for earnings quality that include proxies for degree of matching between contemporaneous revenues and expenses. Specifically, empirical findings suggest that the degree of matching effectiveness is positively related to the predictability and persistence of earnings, while has a negative correlation with the earnings volatility.

Overall, such a results led to refuse the second hypothesis, since empirical evidence highlights that the quality of accounting numbers is systematically related with the degree of matching effectiveness through a direct correlation.

CONCLUSION AND REMARKS

The primary product of accrual accounting is net income and one of the main goals of this kind of financial reporting system is to provide useful information about earnings and its components.

Previous literature highlights extremely mixed opinions about the role of accruals and, above all, about the usefulness of accounting numbers obtained under the accrual accounting system. In particular, the literature review on this topic has shown that such results inconsistency could be due, at least in part, to two reasons. The first one is the vastness of analyzed settings in terms of industries, markets (with their intrinsic inefficiencies), geographic areas, and reference periods. The second cause, instead, could refer to the host of models implemented, in which so many variables and proxies have been used in order to assess similar aspects. Moreover, beside such reasons, another primary issue concerns the ground rules of the accrual accounting system.

However, it has to be pointed out that the usefulness of earnings depends on their quality that, in turn, depends on the quality of its components. Given that the realized cash flows sub-component of earnings is the most reliable element of the financial reporting activity, it goes that the usefulness and the quality of earnings depends on the quality of the accrual sub-component that, in turn, can be influenced by both exogenous factors (firms' economic fundamentals and managerial discretion) and endogenous factors (the reporting system's rules).

In connection with the endogenous factors, a niche strand of research has shown a renewed interest into fundamental analysis and highlights that there has been a

considerable downward trend in the effectiveness of the basic rules of accrual accounting: revenue recognition, matching, and timing. However, the heterogeneity in results and ideas is quite deep, especially with regard to the determinants and the consequences of the detected declining trends. In particular, changes in the accounting systems can be considered as the most compelling and controversial topic, when analyzed in connection with the quality of accounting numbers and its fundamentals.

In analyzing the consequences of a change in the financial reporting system on the effectiveness of the process of matching expenses with revenues for private firms, this study highlights that starting from a situation in which there were no differences in the degree of matching between firms adopting a revenue/expense model and firms that opted for the implementation of an asset/liability approach (when they both adopted a revenue/expense reporting system), the choice to shift over an asset/liability accounting model represents a determinant of the observed worsening in the degree of matching for such a group of firms.

In addition, assuming that the matching process is one of the milestones of accrual accounting, for the purpose of this study it is formally considered as a determinant of the quality of accounting numbers, and not just one of the many earnings quality attributes. Therefore, this study also assesses the effect that the different degree of matching could have on the quality of accounting numbers, controlling for a set of variables that might affect both matching process and earnings quality. Specifically, empirical findings suggest that the degree of matching is positively related to the predictability and the persistence of earnings, while has a negative

correlation with the earnings volatility. In other words, the degree of matching is directly related to the quality of accounting numbers.

This study contributes to the accounting literature in several ways. First, this study collects new empirical evidence about a still partially unexplored topic by extending the analysis concerning the relationship between the financial reporting models ('revenue/expense' vs. 'asset/liability' approach) and the degree of matching between revenues and expenses. Second, although some previous works have already analyzed the impact of IAS/IFRS on matching process and other earnings attributes, none (except for a working paper from Moscariello et al., 2016) has explicitly considered the 'asset/liability' nature of the international standards and examined their impact within an institutional setting traditionally characterized by a 'revenue/expense' approach. Third, to the best of knowledge, this is one of the first studies that investigates the effects of different financial reporting models ('asset/liability' vs. 'revenue/expense') on the basic accounting rules and on earnings attributes of private companies, thereby contributing to the international debate on the effects of the accounting harmonization process for non-listed companies. Finally, this is the first study that analyzes the relationship between the degree of matching and earnings attributes through a direct assessment of such a relationship, relying on the adjustments of classical empirical models.

Anyway, despite the adopted arrangements for improving the robustness of results, the existence of some limitations in this study has to be recognized. First, the analysis is based on a single country and, therefore the estimated effects of a switch in the financial reporting system toward an asset/liability approach (as

proxied by the voluntary IAS/IFRS adoption) on outcomes might be significant only for countries where reporting incentives and enforcement strength are classified as high. Second, empirical evidence highlights a positive impact of a 'revenue/expense' approach on the degree of matching and, in turn, on earnings attributes for manufacturing and service firms, but they cannot be extended to firms adopting a different business model, such as financial firms. Finally, by focusing the attention on one country and relying on a matched case-control design for the sampling process, the methodological concerns probably influencing the investigations (i.e., self-selection bias, sample heterogeneity, and identification problem stemming from reporting incentive research bias) are mitigated, but probably not completely eliminated.

These and other issues should be considered by future works that can also try to deepen the relationship between different accounting systems and other earnings attributes through other fundamentals of accounting, not forgetting the role that could played by the discretionary component of financial reporting. In fact, this field of study is still in its infancy, especially for private firms, and should represent a major concern for regulators and standard setters.

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